
CHAPTER 3—AFFECTED ENVIRONMENT

3.1 INTRODUCTION

Chapter 3 describes the existing condition of the resources, resource uses, and other features of the planning area and the decision area. The affected environment serves as the baseline of existing conditions from which the impacts of the alternatives are analyzed.

The first part of this chapter describes the existing natural and cultural resources, discussing resource indicators, current conditions, trends, forecasts, and key features. The second part describes resource uses, discussing existing and potential uses, forecasts, and trends. The third section describes special designations, and the last section describes social and economic features.

3.2 RESOURCES

The public lands administered by the Kanab Field Office (KFO) are managed for multiple uses. Multiple use management includes the management of resource uses as well as resource values. The decision area is important for its natural areas and values, such as the large number of wilderness study areas (WSAs) and special status species/habitat. These values are important ecologically and scientifically, as evidenced by the continued interest in the area by universities and colleges. The resources in the decision area have also provided the context for diverse land uses. The existing condition of the decision area's resources will provide the context in which management can continue to ensure the sustained yield of multiple uses. The following sections discuss each resource present in the decision area and include, where applicable, a discussion of the following five factors:

- Indicators: Factors that are used to describe the condition of the resources
- Current Condition: Location, extent, and current condition of the resources
- Trends: Degree and direction of change between the present and some point in the past
- Forecast: Predicted changes in the condition of resources given current management
- Key Features: Geographic location, distribution, areas, or types of resource features that should guide management decisions.

3.2.1 Air Quality

In accordance with the 1970 Clean Air Act (CAA) and the 1977 and 1990 Clean Air Act Amendments, the Environmental Protection Agency (EPA) promulgated ambient air quality standards and regulations. The National Ambient Air Quality Standards (NAAQS) were enacted for the protection of the public health and welfare. The Utah Division of Air Quality (UDAQ) is responsible for regulating and monitoring air quality in Utah. Measurements are typically taken in urban areas where ambient pollution levels are expected to be the highest. Concentrations of inhalable particulate matter (PM) less than 10 microns in diameter (PM₁₀) and less than 2.5 microns in diameter (PM_{2.5}) are expected to be higher near towns and unpaved roads. Regional PM₁₀ and PM_{2.5} levels are likely a result of fugitive dust sources.

The existing air quality in the planning area is expected to be typical of undeveloped regions in the western United States. Limited data collected in typical areas indicate that ambient pollutant levels are usually near or below measurable limits. Locations vulnerable to decreasing air quality include the areas immediately around surface-disturbing activities, such as energy and mineral development projects and farm tilling, and local population centers affected by residential emissions.

The most recent UDAQ *Statewide Emissions Inventory Report* shows that the primary air pollutant in Garfield and Kane counties is volatile organic compounds (VOC), followed by carbon monoxide (CO), PM₁₀, nitrogen oxides (NO_x), sulfur oxides (SO_x), and PM_{2.5}. Table 3-1 shows the criteria pollutant levels in tons per year from the Statewide Emissions Inventory.

Table 3-1. 2002 Criteria Pollutant Inventory (tons per year).

Area	PM ₁₀	PM _{2.5}	SO _x	NO _x	VOC	CO
Garfield	5,155	4,024	95	1,638	51,387	57,471
Kane	750	205	89	564	48,948	16,544
Utah Total	82,439	23,288	49,090	205,313	911,310	1,314,041
Utah Average	3,053	1,208	1,818	7,604	33,752	48,668

Source: (UDAQ 2002)

The greatest sources of air pollution emissions in Garfield and Kane counties are area sources and on-road mobile sources. Area sources include small mobile and stationary sources such as gas stations or wood burning. Vehicles are the major source of on-road mobile emissions.

Native American tribal governments have the responsibility to develop, implement, and manage programs within tribal lands. The 1977 CAA authorizes eligible tribes to implement their own tribal air programs. Because tribes in Utah do not have approved tribal implementation plans, the air resources comprising the surrounding Native American Reservations should be viewed as potentially sensitive areas.

Although the Prevention of Significant Deterioration (PSD) program applies only to stationary source permitting activities and does not apply to land use planning decisions, it does help describe the goals and objectives set forth in the *Resource Management Plan* (RMP) and the actions that can be taken to accomplish those goals and objectives. The purpose of the PSD program is to maintain and protect areas of pristine air quality and prevent significant deterioration, while still allowing some development in other areas. Federal, state, and tribal air quality laws and regulations designed to comply with the PSD program are used to help set goals and objectives for the planning area. The concept behind PSD is to keep clean areas clean. Under PSD each area in the country is classified under federal and state law according to the following system:

- Class I—Large areas (e.g., national parks and monuments) that are highly protected
- Class II—Large areas where air quality standards are met, or where they cannot be classified
- Class III—Areas where nonattainment of any criteria pollutant are designated.

The 1977 CAA automatically designated certain large areas (e.g., national parks, national monuments, and wilderness areas established before this date) as Class I areas, the most highly protected category. The following lists the areas within Utah that are designated as mandatory Class I areas (EPA 2000) and their location relative to the planning area:

- Arches National Park—120 miles northeast
- Bryce Canyon National Park—Within the planning area
- Canyonlands National Park—60 miles east
- Capitol Reef National Park—Adjacent to the planning area
- Zion National Park—Adjacent to the planning area.

All other areas where the secondary NAAQS are met, or that cannot be classified, were initially designated as Class II areas. The decision area is designated as either attainment or unclassified with

respect to NAAQS for all criteria pollutants and, therefore, is classified as PSD Class II. The decision area is designated as either attainment or unclassified with respect to NAAQS for all criteria pollutants and, therefore, is classified as PSD Class II. There are no nearby nonattainment areas for the Class I areas listed above.

Other areas with air quality designations administered by federal agencies include Paria Canyon–Vermilion Cliffs Wilderness (managed by the BLM) and Box-Death Hollow Wilderness (managed by the U.S. Forest Service). These were established after August 1977, and are, therefore, Class II areas. In addition, Glen Canyon National Recreation Area (National Park Service [NPS]), and Grand Staircase–Escalante National Monument (GSENM) (Bureau of Land Management [BLM]) are Class II areas. An additional Class I area in the vicinity is Grand Canyon National Park.

Any smoke emissions resulting from annual prescribed burning projects or treatments within the planning area are conducted and managed in compliance with guidelines in the *Utah Smoke Management Plan* and interagency group program. Active group participants include various federal and state agency land managers, as well as the UDAQ. The purpose of this program and the *Utah Smoke Management Plan* is to ensure that mitigation measures are taken to reduce the impacts on public health, safety, and visibility from prescribed fire and wildland fire used for resource benefits (UDAQ 2004). Compliance with the *Utah Smoke Management Plan* is the primary mechanism for land managers to implement prescribed burns while ensuring compliance with the CAA. Burn plans written under this program include actions to minimize fire emissions, exposure reduction procedures, a smoke dispersion evaluation, and an air quality monitoring plan. Proposed burns are reviewed daily by the program coordinator and burns are approved or denied based on current climatic and air quality conditions.

Regional haze is an issue of increasing concern throughout the western United States. Regional haze causes visual impairment by obscuring the clarity, color, texture, and form of what can be seen. As part of the Interagency Monitoring of Protected Visual Environments (IMPROVE) network, visual air quality in Bryce Canyon National Park has been monitored using an aerosol sampler (1988–present) and a 35mm camera (1984–present). The *2004 Annual Performance Report on Air Quality Goals at National Parks* reports measured trends during the past 10 years of data. The report indicates that the visibility trend in Bryce Canyon National Park is improving on the clearest days. The report did not indicate a visibility trend on hazy days.

Atmospheric deposition of air pollutants can increase the acidity of soils and water resources. Measurements of atmospheric deposition are currently being taken in Class I areas of Grand Canyon National Park, Bryce Canyon National Park, and Canyonlands National Park by the National Acid Deposition Program. The *2004 Annual Performance Report on Air Quality Goals at National Parks* indicates the rates of atmospheric deposition of nitrogen and sulfur in rain are relatively low in Bryce Canyon National Park, but are elevated above natural conditions. Trend analysis shows that nitrogen deposition has slightly increased and that sulfur deposition has slightly decreased.

The lack of available data limits the forecasting trends of air quality; however, ambient air quality is not exceeding standards, visibility is typical of clear skies associated with remote areas in the western United States, and atmospheric deposition levels are below federal levels of concern. Future changes to air quality conditions would occur according to the intensity and expansion or reduction of activities that produce air pollutants. However, the use of air pollution mitigation techniques can reduce emissions from sources, and in some cases, also minimize air quality impacts. At this time, future impacts to air quality within the planning area from non-BLM sources (e.g., power plants and fireplaces) are uncertain; however, emissions from these existing sources are not anticipated to increase.

3.2.2 Geology, Topography, and Climate

Most of the planning area is located on the western edge of the Colorado Plateau physiographic province, with the northwestern reaches located in the Basin and Range/Colorado Plateau Transitional physiographic region (Stokes 1986). These two physiographic provinces are further broken into three physiographic subunits—Southern High Plateaus, Grand Staircase, and Kaiparowits Plateau–Escalante Benches. The planning area’s general surface geology is shown on Map 3-1.

Topography

The Colorado Plateau is a massive block of stratified rock that began to rise during a tectonic mountain-building episode between 80 million and 40 million years ago. The layers of rock in the Colorado Plateau are “virtually as level and undeformed as when they were deposited” (Stokes 1986). The Grand Staircase subunit of the Colorado Plateau (Map 3-2) is a series of cliffs and terraces that rise stratigraphically from the Grand Canyon in the south to high plateaus in Utah. A succession of cliffs form a massive staircase displaying more than 200 million years of the earth’s history. The series of cliffs, starting at the southern edge of the planning area, are Shinarump or Chocolate (Triassic), Vermilion (Triassic/Jurassic), White (Jurassic), Grey (Jurassic/Cretaceous), and Pink (Paleogene). Each step in the staircase is present in the planning area. Topographically, the stairstep relief results in a large increase in elevation from the planning area’s southern edge (approximately 5,000 feet above sea level) to its northern edge (more than 10,000 feet above sea level). The Kaiparowits Plateau–Escalante Benches subunit of the Colorado Plateau (Map 3-2), like the Grand Staircase to the west, rises in elevation to the north, with a trellis system of incised canyons cutting along and perpendicular to the northward-aligned geologic structures. The Kaiparowits Plateau consists primarily of Cretaceous age marine and non-marine sedimentary rocks. Older rock units within the subdivision define benches or terraces that border Glen Canyon and Paria Canyon on the south. Younger rocks are exposed in the pink cliffs that define the northern boundary of the subdivision. The decision area in the north is composed of scattered tracts of land between the Dixie National Forest and GSENM. On the south, the Paria Canyon–Vermilion Cliffs Wilderness occupies the southwestern corner of this subunit.

The Basin and Range/Colorado Plateau Transition province is a broad belt between two major western physiographic provinces in which features of both provinces are evident (Stokes 1986). The Southern High Plateaus subunit of the province is “the most extensive, relatively unbroken expanse of extrusive igneous rocks...capping much of the High Plateaus” (Stokes 1986 p. 249). The southern and eastern portions of the subunit are characteristic of the Colorado Plateau; the western and northern landform in the Southern High Plateaus is more characteristic of the Basin and Range (Map 3-2). The southernmost reaches of the subunit are characterized by outcrops of the Claron Formation and sharing of the pink cliffs of the Colorado Plateau’s Grand Staircase subunit. The Southern High Plateaus within the planning area include most or all of the Markagunt Plateau, the Paunsaugunt Plateau, and the Aquarius Plateau. These plateaus are separated by the Sevier Fault (Sevier Valley) and the Paunsaugunt Fault (Johns Valley), respectively. Portions of the Tushar Mountains, the Sevier Plateau, and the Awapa Plateau are also found in the northern part of the planning area. The planning area ranges in elevation from 6,100 feet at the mouth of Circleville Canyon to 11,200 feet on the top of Boulder Mountain.

Mineral and Energy Resource Occurrence

The presence and distribution of minerals in the planning area is controlled by the associated geology. This section addresses the major mineral occurrences within the planning area. More information about the planning area’s geology and associated minerals is provided in the *Mineral Potential Report* (BLM 2005d) for the Kanab Planning Area. That report contains extensive information on the lithology, depositional settings, and stratigraphic relations of the rock units present within the planning area. The

report discusses geologic formations ranging in age from the Precambrian through the Tertiary, although only Permian-age and younger rocks are exposed at the surface (BLM 2005d). In addition, the report describes the area's energy and mineral resources and their potential for development.

Oil and Gas. An area that has the geologic components required for oil and gas to be present and recoverable is called a "play." The U.S. Geological Survey (USGS) defines an oil and gas play as a set of known or postulated oil and (or) gas accumulations sharing similar geologic, geographic, and temporal properties, such as source rock, migration pathway, timing, trapping mechanism, and hydrocarbon type. The USGS has identified four oil and gas plays within portions of the planning area. Many of these plays are hypothetical because they have no proven reserves or production history. The four oil and gas plays are the following:

- Late Proterozoic/Cambrian Play
- Paleozoic Devonian-Pennsylvanian Play
- Permo-Triassic Unconformity Play
- Cretaceous Sandstone Play.

Although it is possible that one deep well could test all five stratigraphic intervals of the plays, each play is considered an individual target that will have separate, spatially isolated hydrocarbon accumulations that must be discovered on a play-by-play basis. The Late Proterozoic/Cambrian Play and Cretaceous Sandstone Play are rated moderate (M) for occurrence potential with a moderate (C) level of certainty. The Devonian-Pennsylvanian Play and the Permo-Triassic Play are rated high (H) for occurrence potential with a high (D) level of certainty.

Only limited exploration and development for oil and gas has occurred within the planning area. As of 2005, there is only one producing oil field, the Upper Valley field, which was discovered in 1964 (BLM 2005d). During development of this field, oil and gas resources were identified in several geologic formations, although production is predominantly from formations within the Permo-Triassic Unconformity Play. The Upper Permian Kaibab Formation is one of the primary oil-producing units in the Upper Valley field. Early development of the field also produced minor amounts of oil from the deeper Mississippian Redwall Limestone in the Paleozoic Devonian-Pennsylvanian Play (BLM 2005d). Wells into this formation are currently capped, but there is potential for further development and production.

In addition to the occurrence of conventional oil and gas, the potential for coalbed natural gas (CBNG) has been identified in the planning area. The presence of methane gas in coal seams has long been recognized; however, only recently have some coals been recognized as both a reservoir and source rock for this unconventional energy resource. Under some geologic conditions, the methane produced in coalbeds can be extracted. New plays have been identified for areas that are prospective for CBNG. This group, known as the Cretaceous Coal Bed Gas Plays, was defined by the Utah Geological Survey (UGS) to cover potential reservoir areas of the coal-bearing Upper Cretaceous units of south-central Utah (Dakota and Straight Cliffs Formations). Depths of the coalbed reservoirs in this group of plays range from 0 to about 6,000 feet. The Cretaceous Coal Bed Gas Play is rated moderate (M) for occurrence potential with a moderate (C) level of certainty.

Another related petroleum resource, known as tar sands, is present on the eastern edge of the planning area. This deposit is a play along the Permo-Triassic Unconformity that over time has been exposed to erosion, allowing the volatiles from the oil and gas reservoir to escape and leaving a viscous tar-like substance.

Coal. Beds of coal thick enough to be mined commercially occur in the Dakota Formation and Straight Cliffs Formation in the planning area (Doelling and Graham 1972, Doelling et al. 1989). Areas within each field that have thick, shallow coal are rated high (H) for occurrence potential with a high (D) level of certainty. The deeper and thinner parts of each coal field are rated as high (H) for occurrence potential with a moderate (C) level of certainty.

The coals of the Dakota Formation (Alton and Kolob coal fields) and the Straight Cliffs Formation (Kaiparowits Plateau Coal Field) were deposited by a series of coalescing delta complexes derived from a westerly source. Local lenses and stringers of coal can be found in the Triassic Chinle Formation in the planning area, but none are thick enough for commercial development.

There are two commercial coal zones in the Dakota Formation (Smirl and Bald Knoll). These coalbeds are as thick, but lower in heat content and higher in ash and sulfur content than the coalbeds mined in the Blackhawk Formation in the coal fields of central Utah. More information on the quality of the coal in these fields is contained in the *Mineral Potential Report* (BLM 2005d). The part of the Alton coal field within the planning area contains a total of 1,278 million tons, of which 203 million tons (about 16 percent) is at surface minable depths (Doelling and Graham 1972). The topography of the Kolob coal field in the decision area is steeper than in the Alton area, resulting in little coal that is surface minable. Therefore, no surface minable resource was calculated, and all 1,360 million tons of coal in the part of the Kolob field within the planning area would probably have to be accessed by underground methods.

The Straight Cliffs coals are exposed on the eastern and western margins of the Kaiparowits Basin in the Escalante and Tropic areas, respectively. The majority of these coals are not within the decision area, although they are within the planning area. They are thicker and more numerous on the eastern side of the Kaiparowits coal field near Escalante and thinner to the west (BLM 2005d). The coal down to a depth of 3,000 feet is potentially minable; the coal between 1,000 and 6,000 feet deep could be prospective for CBNG. The maximum measured total net coal thickness in the Straight Cliffs coals in the planning area is 100 feet in a drill hole north of the town of Escalante. Although the ash and sulfur levels of the analyzed portions of the Straight Cliffs Formation are similar to those of the coal currently being mined from the Blackhawk Formation in central Utah, their moisture content is considerably higher and the heat content correspondingly lower. More information on the quality of the coal in these fields is contained in the *Mineral Potential Report* (BLM 2005d).

The Johns Valley area is an informally named coal-bearing area in Township 33 and 34 S, Range 2 W (Doelling and Davis 1978). Several drill holes in the southeast corner of Section 33, Township 33 S, Range 2 W penetrated an 18-foot-thick coalbed in the upper part of the Dakota Formation at depths from 400 to 700 feet. More wide-spaced drilling would be needed to define minable resources in the Johns Valley area.

Geothermal. Geothermal energy is heat that originates within the earth. With few exceptions, the higher temperature geothermal areas in Utah occur either in the Basin and Range province or in the Transition Zone. The Transition Zone coincides mainly with the Garfield County portion of the planning area, but extends slightly into the northern part of Kane County. Identified geothermal areas are located primarily in western Garfield County within the Basin and Range province and the Transition Zone. Few low-temperature thermal springs occur within the planning area. Although some springs are present in areas with geothermal indicators (e.g., young volcanic rocks and recent faulting), there are no identified geothermal temperature systems in the planning area.

Locatable Minerals. Several locatable mineral commodities occur throughout the planning area in small, sub-economic deposits, or as minor minerals associated with other mineral deposits. Minerals such as copper, chromium, lead, fluorine, manganese, mercury, silver, titanium, and zirconium could occur, but

are minor occurrences that have no potential for future development in the next 15 years (BLM 2005d). Minerals with deposits of significance are uranium and vanadium, antimony, limestone, gypsum, and septarian concretions.

The principal uranium-vanadium hosts in the planning area are the Dakota Formation (and uppermost Carmel Formation) and the Shinarump Member of the Chinle Formation. However, within the planning area, neither formation contains large or high-grade deposits. Two areas of the Chinle Formation that have the potential for a uranium-vanadium deposit occur within the planning area; one is in the southwestern part of the area, straddling US Highway 89, and the other is in the northeast part of the area, on the west flank of the Teasdale anticline. Doelling et al. (1989) report that only two small prospect pits were found in the southwestern area, and it is unlikely that new large, ore-grade deposits will be found in this area. At least five prospects have been opened on the Teasdale anticline Chinle deposits, but these deposits are generally lower grade than similar deposits found elsewhere in Utah. An area of very low-grade uranium deposits, known as the Bulloch group of claims, is located on both sides of Orderville Gulch in the western portion of the planning area (Doelling et al. 1989).

An area of interest for antimony is situated in the northern section of the planning area in Antimony Creek Canyon. Antimony ore occurrences are found on both sides of the canyon for a distance of a little more than 2 miles and in Russell Hollow and Dry Wash about 5 miles north of Antimony Canyon.

Several geologic formations in the planning area contain limestone and dolomite, but there is limited information about their purity or utility. The two most important limestone-bearing units are the Carmel and Claron Formations. Because limestone materials are common and widespread, a local market is necessary if a source is to be economic. It is unlikely that a high-purity resource can be found (BLM 2005d).

Gypsum is abundant and widespread in the planning area; however, no deposits have been developed other than small mining operations for sculpting alabaster. The most important gypsum deposits are found in the Paria River Member of the Carmel Formation, which contains massive, white gypsum in beds from 3 to 30 feet thick that remain fairly consistent in thickness across much of the area (Doelling et al. 1989). In places the gypsum beds in the Paria River Member have little cover, making them suitable for surface mining and the most likely locations for potential commercial development. Smaller beds of gypsum suitable for sculpting alabaster can be found in the Wiggler Wash Member of the Carmel Formation.

Septarians are concretions or nodules of limestone or dolomite with calcite infilling that have formed in the Tropic Shale. Active mining is occurring northwest of Mt. Carmel. The septarians are cut and polished to make a variety of gem figurines or larger objects such as bookends.

Salable Minerals. Several salable mineral commodities occur in the planning area. The occurrence of diatomaceous earth and glass sand is noted here, but these commodities will not be discussed further because they are minor occurrences that have no potential for future development in the next 15 years (BLM 2005d). The salable mineral deposits of significance are sand and gravel, stone, and clay. Certain collectable commodities such as petrified wood, septarian concretions, agate, jasper, and common non-vertebrate fossils also occur, but their removal would occur primarily as incidental activities that would not involve significant disturbance of the land surface.

Sand and gravel resources that meet construction specifications are not abundant in the planning area; however, there is a distribution of excellent deposits that do (BLM 2005d). There are seven main areas in the planning area that have been exploited for sand and gravel and that have the best potential for future development: the Sevier River drainage, the East Fork of the Sevier River drainage, the upper Paria River drainage near Cannonville, the East Fork of the Virgin River drainage, the Johnson Wash drainage north

of US Highway 89, the upper Escalante River drainage, and the Wahweap Creek drainage near Big Water (BLM 2005d). There also are several other areas that might contain exploitable sand and gravel. Unconsolidated Quaternary deposits are the chief sources of sand and gravel and there are many varieties of such deposits. Alluvium is found in stream channels or in the floodplains of streams; the Utah Department of Transportation (UDOT) considers this material as sources of borrow only. Pediment gravels form caps on knolls, ridges, and benches and are the principal sources of gravel. Landslides scattered throughout the area contain too much clay and not enough gravel to be economically exploitable. Glacial deposits, such as moraines, till, and outwash, usually consist of boulders and clay, although they may contain local beds of gravel. Aeolian deposits are principally dune sands, which form potential borrow sources. Tertiary gravels and conglomerates are excellent sources of sand and gravel.

The *Mineral Potential Report* (BLM 2005d) considers four categories of stone: (1) crushed and broken stone, (2) building/dimension stone, (3) field stone, and (4) ornamental stone. Various rock units in the planning area are potential hosts for different types of stone deposits. The following describes characteristics of these rock units:

- Not all the rock in the geologic formations produce good crushed stone. The Paleozoic limestones would make the best material, but there are very limited exposures of these units. Intrusive igneous rocks would be adequate for many of the uses, but would be difficult to quarry. The primary crushed stone in the decision area comes from tertiary quartzite terrace gravels.
- Dimension stone is rock that is easily broken along planes of weakness, such as bedding planes and inherent fractures or joints, to produce blocks, sheets, or slabs, which satisfy dimensional requirements. Several formations exposed in the planning area can provide suitable dimension stone, but there has been little to no production from most. There are areas of igneous intrusives that could be an excellent source of granitic dimension stone. However, the use of stone from the planning area is not likely to occur unless there is a specific local need because there are similar resources available in the metropolitan areas of northern Utah.
- Field stones are defined as cobbles, boulders, and rocks that can be used as is, or split and trimmed with little effort. Field stone has been used in Utah from the time the pioneers first began to build. Many formations have rock of suitable strength that could be used as field stone. This market is expanding with the growth in the area, but will remain minor unless a specialty material is found.
- Ornamental stone may be in crushed form, in dimension stone, or even in field stone condition, but must have the added feature of attractiveness. Most sandstone in the planning area is tinted with varying amounts of tan to brown staining. Some sandstones are interestingly mottled, banded, and even have artistic patterns. This is observable in several formations, but probably best developed in the Navajo Sandstone and the Shinarump Member of the Chinle Formation near Kanab. Burnt shale (clinker) is quarried from areas in the Dakota Formation where coalbeds have burned and baked the surrounding shale into a red gravelly material. The material is used as a decorative landscaping cover.

Clay, claystone, mudstone, and shale deposits have seen limited development and testing for quality in the planning area (Doelling, 1975, Doelling et al. 1989). Clay is present in several formations, especially the Chinle (Monitor Butte and Petrified Forest Members), Dakota, Tropic, Straight Cliffs, and Claron, and in some volcanic units, but only a few localities have been examined specifically for clay. The clay-bearing units contain fairly thick and extensive deposits of clay that can be used for general purposes.

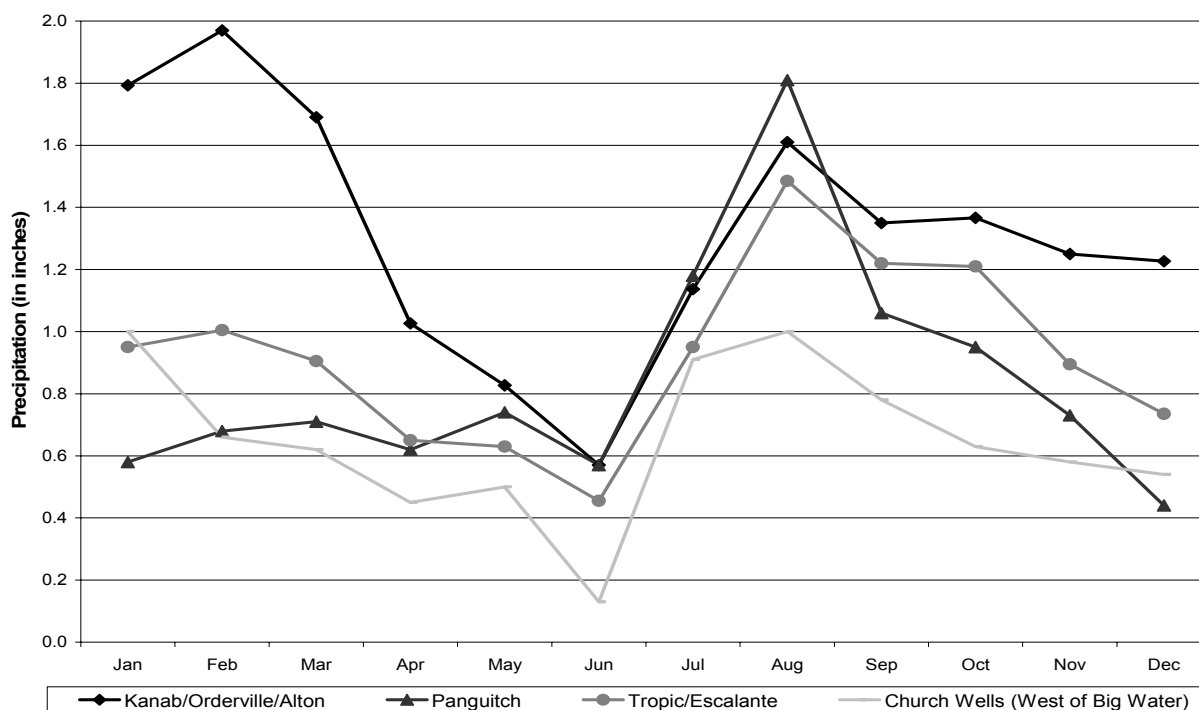
Humate is derived from plant debris associated with carbonaceous shales or coals that were deposited in a swampy, continental environment. The most desirable feature of humate is its humic acid content, which is used to enhance soil productivity (BLM 2005d). In the planning area, humate deposits are found along the outcrops of the Cretaceous Dakota and Straight Cliffs Formations, which contain several thick

intervals of carbonaceous shale and shaley coal. This humate interval occurs along the exposures of the Dakota Formation in the Alton and Kolob coal fields, primarily in Kane County, and the Straight Cliffs Formation, primarily in Garfield County. The topography of the Alton coal field is not as steep as that in the other two coal fields and would likely have more extensive areas of humate development along the outcrop where the coalbeds have not burned.

Climate

Climate is a characterization of the atmosphere over a long period of time, which takes into account temperature, precipitation, and wind. Annual precipitation varies with elevation. In the higher northern portions of the planning area, precipitation varies from 9 inches annually in the canyons and valleys to more than 30 inches in the high mountains (Map 3-3). As the elevation decreases to the south, annual precipitation decreases to a more uniform 11 to 17 inches between Kanab and Zion National Park, and to only 5 to 8 inches in the Paria Canyon–Vermilion Cliffs Wilderness. Similarly, the timing of precipitation varies throughout the planning area (Figure 3-1). In the southwest and southern portions of the planning area (Kanab, Orderville, Alton, and Big Water), precipitation occurs in a pronounced bi-modal distribution, with peaks in the winter and summer months. Precipitation in the remainder of the planning area is dominated by rains associated with the summer monsoons from July through October. Springtime months (April, May, and June) are generally the driest in the planning area, although the winter months (December and January) are the driest in the Panguitch area.

Figure 3-1. Average Monthly Total Precipitation –(1971-2000)



Source: Western Regional Climate Center 2006

Cycles of drought are a normal occurrence in the planning area. The variations in elevation and precipitation combine to produce varying climate zones. The average annual high temperature in Kanab is

approximately 70°F, and varies from 47°F in the winter to about 93°F in the summer. The average annual low temperature is about 39°F, and ranges from 22°F in the winter to approximately 58°F in the summer.

3.2.3 Soil Resources

Soils in the planning area vary based on landform, geology, vegetation, and microclimate. They range from shallow, weakly developed and rocky soils on plateaus, cliffs, and ridges to deeper, more productive soils on alluvial fans and in valley bottoms. The dry climate and parent materials have also affected development and concentrations of carbonates, salts, and gypsum within the soils and rooting zones, which affects plant growth and water movement. The sandy parent materials throughout much of the decision area are characterized by well-drained, sandy soils forming in stabilized and active dunes. Some of these soils are dunes stabilized by a vegetative cover of shrubs and grasses (Sutcliffe 2004). Loss of vegetation in these soils may result in the short-term reactivation of the dunes and increases in wind erosion.

Many resources and resource uses depend on the presence soils of suitable quality for their sustainability and continued health; therefore, soil attributes and conditions are important to BLM management decisions. Soil data are available for only a limited portion of the decision area. In 1990, the Soil Conservation Service, in cooperation with the Forest Service, BLM, and Utah Agricultural Experiment Station, conducted a soil survey of the Panguitch area, including parts of Garfield, Iron, Kane, and Piute counties. The most recent soil survey in the region was conducted in 2003 in GSENM. The BLM coordinates soil management efforts with other management agencies or committees, such as the Upper Sevier Watershed Committee and the Virgin River Management Plan Watershed Advisory Committee.

Rangeland health evaluations have been conducted throughout the decision area, which contain assessments of soil condition indicators. The indicators are qualitative evaluations of an area's departure from anticipated ecological conditions, usually obtained from a representative site description. Indicators include rills, gullies, soil surface resistance to erosion, compaction layers, evidence of wind erosion, and loss or degradation of soil surface. More than 97 percent of the sites were classified as none to slight or slight to moderate departure from the site description. These evaluations indicate that the landscape-level soil condition within the decision area is largely considered to be functioning, although there may be site-specific issues of soil impacts or degradation.

Salinity

Salt and sediment yield are major concerns in the Colorado River Basin, and erosion on public lands is one source of sediment and associated salts in the decision area. Some of this erosion is natural or results from relatively stable conditions in a semiarid climate regime with periodic, high-intensity storms. Salt enters the Colorado River and its tributaries from groundwater flows, surface runoff, and from point sources such as saline springs and flowing wells. Dissolution of minerals from saline soils results in highly saline groundwater that ultimately contributes the largest amount of salt to the Colorado River system. Surface runoff from BLM-administered lands on the entire Colorado Plateau is estimated to contribute less than 15 percent of the total salt load, and the decision area would contribute only a small portion of that total contribution (USDOI 2003). Salinity in rangeland surface runoff can be closely related to vegetation and soil erosion, especially in areas with saline soils; thus, effective vegetation management and minimizing soil erosion can help to reduce and control salinity in rangeland surface runoff. Saline geologic formations and slightly to highly saline soils are present in the decision area. Major salt-bearing formations that act as parent material for saline soils include the Tropic Shale, Moenkopi, and Carmel. Although saline soils can inhibit vegetation growth, salts that are held deeper in the soil profile are generally not a major source of salinity to the Colorado River system, except along drainages where bank erosion or subsurface leaching occurs.

Sensitive and Fragile Soils

Some of the soils within the decision area are prone to erosion or difficult to restore because of intrinsic properties such as steep slopes, high salt or gypsum content, low available water-holding capacity, clayey textures, or high water tables. These soils are generally defined in this RMP as “sensitive soils” and sometimes require protection or restoration measures beyond standard operating procedures and best management practices to minimize impacts of surface-disturbing activities. Design of such protection measures is best done during site-specific project planning. Currently, there is insufficient soils data to map these areas accurately, and they are usually determined at the project level through field verification of available data.

For the purposes of this analysis, a subset of these sensitive soils are “fragile soils” (i.e., highly erosive soils), which were identified and mapped using the available soil, geology, topographic information, and best professional judgment and experience. The criteria used to define and map fragile soils include high soil salinity, very fine textures, shallow depths, and steep slopes (greater than 30%). Soils derived from Tropic shale or from other saline sedimentary formations tend to be high in salts, and high salt accumulations affect the availability of plant nutrients and water for plant growth. Because of the resultant sparse vegetative cover on these soils, soil particles may not be “anchored” in place and may easily be eroded by wind or water. Slope steepness also increases the erosion potential of soils because it increases the rate at which water will flow overland and transport soil particles. Many scientists (Swenson and Bayer 1990) identify slopes of 20–35 percent as potentially contributing to a severe erosion hazard. Soil texture also contributes to the integrity of soil. Fine-textured soils such as clays or silty clays have slow infiltration rates and high runoff rates. As a result, rills and gullies form easily during storm events. In the decision area, there are approximately 6,300 acres of soils identified as fragile soils based on these criteria (Map 3-4).

Biological Soil Crusts

Biological soil crusts are recognized as having an influence on terrestrial ecosystems where they occur. These communities, referred to as cryptogamic, cryptobiotic, microbiotic, or microphytic soil crusts, serve as a living mulch by retaining soil moisture and discouraging the growth of some types of annual weeds. They can reduce wind and water erosion, fix atmospheric nitrogen into a form usable by plants, and contribute to the soil organic matter (USDOI 2001). These crusts can be used as indicators of physical disturbance. Biological soil crusts are found on various soil surfaces throughout the decision area (USDOI 2001).

Total crust cover is usually inversely related to vascular plant cover, as less plant cover results in more surface available for colonization and growth of crustal organisms (USDOI 2001). When all crust types are combined (e.g., cyanobacterial, moss, lichen), cover is greatest at lower elevation inland sites because there is less vascular plant cover. In the decision area, most of the biological soil crusts are mostly cyanobacteria (*Microcoleus*) and nitrogen-fixing lichens (*Collema*). These cyanobacteria and nitrogen-fixing lichens are generally limited and sparse in the decision area because of the relatively high elevations (4,500–9,000 feet) and the relatively dense vascular plant cover. However, there are small areas of more concentrated soil crusts within the decision area, especially at lower elevation dry sites with less dense vegetative cover. There has not been a systematic inventory of soil crusts within the planning area, although there is a growing body of literature and research on soil crusts of the Colorado Plateau, especially related to land use and management. This research indicates that biological crusts are sensitive to physical disturbance, increased frequency and intensity of fire, and global climate changes (USDOI 2001). Sandy, course-textured soils with low stability, fertility, and water-holding capacity recover more slowly than fine-textured soils with high silt or clay content. Stable areas with low slopes, little sand

movement, and embedded rocks are quicker to recover than less stable sites with steeper slopes and more soil surface movement or sand deposition (USDOI 2001).

The importance of biological soil crusts is recognized by the scientific community and by the BLM. Biological crusts can stabilize the surface by protecting it from wind and water erosion. Generally biological crusts are considered to aid in infiltration of water and, because they increase surface roughness, they reduce runoff and increase the amount of water storage for plants. In semi-arid systems biological crusts can provide a significant amount of nitrogen for plant growth. However, research has not determined how much soil crust is needed in a certain soil type or ecological range site or woodland community for ecological processes to operate in a healthy state (Curtis 2005). That is, there is no clear “biological crust yardstick” that can be applied on a site-specific basis to allow for sound and reasoned decisions on this subject to quantify the appropriate amounts and distribution of biological soil crusts.

The BLM’s standard for assessing the conditions of public lands involves the use of ecological sites and woodland community descriptions developed for specific soil survey areas in accordance with standards established and developed by the Natural Resource Conservation Service (NRCS), U.S. Department of Agriculture (USDA). These ecological site descriptions generally do not contain specific information about the quantities of cryptobiotic crusts that are expected to be on the site.

Prime and Unique Farmland

By definition, no prime farmland occurs within the decision area. However, some areas could qualify as prime farmland if an adequate and dependable water supply were available. Precipitation is inadequate and dependable irrigation water is lacking on BLM lands. Unique farmlands or additional farmlands of statewide or local importance within the decision area have not been identified.

3.2.4 Water Resources

Water resources are important in dry environments. The BLM manages water resources for resource values (e.g., watershed health, wildlife, riparian) and resource uses (e.g., recreation and water supply) within the framework of applicable laws, regulations, and agency policies. The water resources traverse BLM-administered land and could be affected by BLM management activities.

Hydrology and Watershed

This section addresses both surface water and groundwater quality and quantity. Watershed management is the protection, conservation, and use of the natural resources of a specific watershed in a manner that keeps the soil mantle in place and productive. The BLM manages watersheds to ensure that water yield and quality meet the desired uses. Watersheds can exhibit undesirable responses (e.g., severe flooding or erosion) following natural or human-caused vegetation or soil disturbance. Surface-disturbing activities could affect watershed health, which could increase erosion rates and sedimentation and affect water quality.

Portions of the Lower Colorado, Virgin River, and Sevier River Basins are located within the planning area. Within these three basins there are 11 subbasins, or fourth-order watersheds, and 31 fifth-order watersheds. The fourth-order watersheds are listed in Table 3-2 and shown on Map 3-5.

Table 3-2. Fourth-Order Watersheds

Hydrologic Unit Code (HUC)	Watershed
14070001	Upper Lake Powell
14070003	Fremont
14070005	Escalante
14070006	Lower Lake Powell
14070007	Paria
15010003	Kanab
15010008	Upper Virgin
15010009	Fort Pierce Wash
16030001	Upper Sevier
16030002	East Fork Sevier
16030006	Escalante Desert

Source: USGS 2005

Groundwater Quantity and Quality

Three Colorado Plateau aquifers underlie the planning area; the Mesaverde aquifer (composed of Cretaceous sandstones), the Dakota–Glen Canyon aquifer (composed of lower Cretaceous, Jurassic, and Triassic sandstones, including Navajo Sandstone), and the Coconino–De Chelly aquifer (composed of Permian sandstones) (Freethey and Cordy 1991, Robson and Banta 1995). Although the quantity and quality of the water in these aquifers are extremely variable, the aquifers are capable of yielding usable quantities of water with a quality suitable for most agricultural or domestic uses. In addition, there are many shallow perched aquifers of water-bearing Quaternary river gravels associated with floodplains. These smaller aquifers are important for irrigation and domestic water supply.

Groundwater is important for many resources and uses. Ecologically, groundwater supports important hydrologic features such as seeps, springs, hanging gardens and riparian areas. In these areas groundwater provides regular supplies of water that support biologically diverse vegetation and wildlife species. Range management may utilize groundwater for water developments at springs and wells, providing consistent water sources for livestock and wildlife. Groundwater is a vital resource for the communities in the planning area. The development and use of groundwater resources has influenced the economic development and growth of the area. “Groundwater is used for public water supply, irrigation, domestic supply and for stock watering” (Utah Board of Water Resources 1993).

Groundwater quality is classified by the Utah Water Quality Board based primarily on the amount of total dissolved solids (TDS). Lower amounts of TDSs indicate higher water quality. The quality of the water in the Mesaverde aquifer is extremely variable. However, in the planning area, limited data indicate that TDS concentration ranges from about 1,000 to 4,000 milligrams per liter. In general, areas of the Mesaverde aquifer that are recharged by infiltration from precipitation or surface water sources contain relatively fresh water. The Dakota–Glen Canyon aquifer system underlies the majority of the planning area. The depth to the top of the Dakota–Glen Canyon aquifer system is approximately 2,000 feet. In general, where the aquifer system is less than 2,000 feet below land surface, TDS concentrations are less than 1,000 milligrams per liter. In the planning area, the TDS concentration in water from the Coconino–De Chelly aquifer is approximately 1,000 milligrams per liter (USGS 2005).

Groundwater recharge areas are vulnerable to surface sources of pollution because groundwater movement is generally downward due to gravity and because primary recharge areas do not have

protective layers to filter pollutants. Potential sources of groundwater pollution include agricultural operations, various types and methods of waste disposal, mining operations, and natural geologic conditions. Pollution related to natural geologic conditions is nearly impossible to control. To date there has been little or no pollution to groundwater from produced water associated with mineral operations.

Surface Water Quantity and Quality

A stream is a general term for a body of flowing water. In hydrology the term is generally applied to water flowing in a natural channel as distinct from a canal. Streams in natural channels are classified as being perennial, intermittent or seasonal, or ephemeral.

Major rivers and streams located within the planning area are the Escalante River, Kanab Creek, Sevier River, East Fork Sevier River, Paria River, and East Fork Virgin River. There are also numerous springs and small streams that are often diverted for livestock watering and irrigation. Most human use of the water from these rivers and streams is for agricultural purposes. Other beneficial uses include instream (recreation and fish habitat), culinary, irrigation, and industrial uses, which vary over time, with more water being diverted during the vegetative growing season.

The State of Utah has designated the North Fork Virgin River and tributaries and East Fork Virgin River and tributaries as High Quality Waters—Category 1. As defined by Rule R317-2-3 of the Utah Administrative Code, “waters of high quality which have been determined by the Utah Water Quality Board to be of exceptional recreational or ecological significance or have been determined to be a state or national resource requiring protection shall be maintained at existing high quality through designation as High Quality Waters—Category 1.” In these waters, rule R317-2-3.2 directs that “new point source discharges of wastewater, treated or otherwise, are prohibited” and that diffuse sources (non-point sources) of wastes not covered by other existing state regulations “shall be controlled to the extent feasible through implementation of best management practices or regulatory programs.” State regulations do provide that “projects such as, but not limited to, construction of dams or roads will be considered where pollution will result only during the actual construction activity, and where best management practices will be employed to minimize pollution effects.”

Generally, as water moves downstream and is diverted and used, water quality deteriorates. The major sources of pollution to surface water are natural sedimentation from highly erosive substrates and man-caused non-point sources, and increased salinity levels. Water quality standards are set by the State of Utah according to EPA guidelines. These standards identify the uses for each water body and aquatic life support, and the scientific criteria supporting those uses. Pursuant to Section 303(d) of the Clean Water Act each state is required to identify water bodies that do not meet state water quality standards. A total maximum daily load (TMDL) is calculated for water bodies that do not meet water quality standards. The TMDL is the maximum amount of a pollutant that a water body can receive and still meet water quality standards. A complete list of the rivers, streams, lakes, and reservoirs within the decision area for which TMDLs have been completed or that require TMDLs is found in Table 3-3.

Table 3-3. River and Stream Assessment Units That Require a TMDL

Water Body Name	Water Body Description	HUC Unit	Causes
Upper Escalante	Escalante River and some tributaries from Boulder Creek confluence to Birch Creek confluence	14070005	Temperature

Water Body Name	Water Body Description	HUC Unit	Causes
Paria River-1	Paria River from start of Paria River Gorge to headwaters	14070007	Salinity/TDS/chlorides
Paria River-3	Paria River and tributaries from Arizona-Utah state line to Cottonwood Creek confluence	14070007	Salinity/TDS/chlorides
Upper Sevier	Sevier River and tributaries from Horse Valley Diversion upstream to Long Canal Diversion, excluding Panguitch Creek, Bear Creek, and their tributaries; Sevier River and tributaries from Long Canal to Mammoth Creek confluence	16030001	Total phosphorus, habitat alteration, and sediment

Source: Utah DEQ Division of Water Quality 2004

Interagency working groups have been developed management for the Upper Sevier watershed. The *Upper Sevier Watershed Management Plan* addresses cooperative watershed management and water quality on private, state, and federal lands within the watershed. Management issues include watershed quantity and quality as well as riparian health. The BLM helped develop the multi-agency plan. Similar cooperative efforts are underway for the Virgin River Watershed.

Water Rights

A water right is composed of a quantity, source, priority date, type of use, season of use, and point of diversion. In Utah and most of the western states, the priority to receive water is based on the date on which water use first began; this is known as the prior appropriation system. The State of Utah, through the state engineer, administers the water rights for the State of Utah. Individual and institutional owners control the rights of the waters that flow through and under the decision area. The BLM protects its water needs by participating in water rights adjudication and permitting processes, forming cooperative relationship with the Utah Division of Water Rights, and filing protests as necessary to protect BLM water uses.

Water Supplies

Water resources in the decision area have been developed for use as long as humans have been establishing permanent settlements in the area. These developments have varied from stream diversions for irrigation to spring development by early European settlers. After 1900, groundwater wells were developed (Utah Board of Water Resources 1993). According to BLM geographic information system (GIS) data, there are 16 developed wells/springs in the decision area and 55 developed wells/springs on lands adjacent to the decision area. Of these developed wells/springs, 43 are active, 21 are inactive, and 6 are currently in the planning stages. Most community water supplies rely on groundwater wells; only the town of Fredonia relies on a surface water diversion, and that is fed by groundwater springs. The BLM KFO has entered into agreements with communities in the planning area to protect the watersheds associated with these water supplies.

3.2.5 Vegetation

Vegetation provides aesthetic appeal, as well as food and habitat for wildlife and livestock. Vegetation also provides root systems that help maintain soil integrity and reduce erosion (particularly on steep slopes and in areas adjacent to waterways) and provides forest and woodland products. Many BLM land management policies are directed toward maintenance of healthy vegetation communities. Vegetation can generally be characterized by ecological provinces, and more specifically by communities and associations. The vegetation communities and associations discussed in this section comprise the major vegetation communities and associations in the decision area. Upland vegetation, riparian/wetland vegetation, and invasive species are discussed in this section. Special status plant species (threatened and endangered [T&E] species and sensitive species) are discussed in the Special Status Species section.

Ecological Provinces

The planning area is situated in the canyon, plateau, and desert areas of the Colorado Plateau physiographic province and corresponds with Bailey's description of the Colorado Plateau Semi-Desert province (Bailey 1995). The Colorado Plateau Semi-Desert province portion of the planning area has noticeable vegetation zones, but they lack uniformity.

Plant Communities and Associations

Plant communities and associations are groups of plant populations that coexist in space and time and directly or indirectly affect each other's population dynamics. Distinct plant communities are influenced by characteristics such as soil depth, texture, and salinity; climate variables, particularly temperature, total and seasonal distribution of precipitation, and wind; and topographic features, the most important of which are elevation, aspect, and slope. The following discussions of plant communities that occur within the decision area show the diverse and complex nature of the vegetation resources in the area.

Plant communities can be represented by plant cover types that reflect the dominant species present in an area, such as the plant cover types documented by the Southwest Regional Gap Analysis Project (SWReGAP) data. The SWReGAP is an update of the Gap Analysis Program's mapping and assessment of biodiversity for the five-state region encompassing Arizona, Colorado, Nevada, New Mexico, and Utah. The 43 SWReGAP land cover types were combined to form 9 vegetation cover types (Table 3-4 and Map 3-6) to better reflect the BLM's management of vegetation communities and associations. Table 3-4 lists acres and percent of vegetation communities and associations in the decision area. Because of the dispersed nature, relatively small size, and limited amount of riparian/wetland vegetation communities in the decision area, SWReGAP landscape-level remote sensing is not an accurate method for their inventory or condition assessment. SWReGAP readings related to riparian/wetland communities are included in the various adjacent vegetation categories, which are described in the categories' narratives. Site-specific riparian/wetland inventories and assessments have been conducted throughout the decision area. Results of these inventories and assessments are discussed in the Riparian/Wetland section.

Table 3-4. SWReGAP Vegetation Communities

Vegetation Communities or Associations	Acres	% of Decision Area¹
Aspen	350	<1
Other	700	<1
Mixed Conifer	550	<1
Ponderosa Pine	4,200	<1
Oak/Mountain Shrub	15,100	3

Vegetation Communities or Associations	Acres	% of Decision Area¹
Desert Scrub	22,200	4
Non-Vegetated	40,200	7
Sagebrush Steppe	145,900	26
Pinyon-Juniper Woodland	324,800	59
Total	554,000	100

¹ Rounded to nearest %.

Source: USGS 2004a (SWReGAP data)

Upland Vegetation

The BLM divides the landscape into ecological sites for the purposes of inventory, evaluation, and management. “An ecological site is a distinctive kind of land with specific physical characteristics that differs from other kinds of land in its ability to produce a distinctive kind and amount of vegetation” (BLM 2001a). Each ecological site has characteristic soils, hydrology, and a kind and amount of vegetation adapted to specific fire regimes and herbivory (BLM 2001a). Within each site, the soils, hydrology, and vegetation communities are interrelated, each affecting the development of the other.

Vegetation communities on an ecological site are in a dynamic state of succession and retrogression. “Succession is the process of soil and plant community development on an ecological site. Retrogression is the change in species composition away from the historic climax plant community due to management or severe natural climatic events” (BLM 2001a). Vegetation communities are in a continual flux based on relationships with and responses to climate (e.g., drought and wet periods), disturbance (e.g., fire, lack of fire, human-caused disturbances), insects and disease, and management intervention. The BLM uses a state and transition model to explain vegetation dynamics and associated management interactions on each ecological site (BLM 2001a). This model enables extensive, complex information to be described in terms of relatively stable vegetation conditions (state) and transitions from one ecologically adapted vegetation community to another, leading to the potential natural community (PNC). A PNC “is defined as the biotic community that would become established on an ecological site if all successional sequences were completed without interference by people under the present environmental conditions” (BLM 2001a). The existing vegetation community in a given area can be compared to the PNC for that area’s ecological site in terms of the kind, proportion, and amount of vegetation the site is capable of producing (BLM 2001a). This comparison provides the means for identifying the existing successional status of vegetation. Table 3-5 identifies the successional status based on Rangeland health evaluations conducted throughout the decision area.

Table 3-5. Successional Status

Status	% PNC	# of Sites	% with Value	% Total
Early Seral Class	0-25	9	2	2
Mid Seral Class	26-50	116	32	30
Late Seral Class	51-76	182	50	47
PNC	76-100	60	16	15
None	-	22	-	6
Total	-	389	100	100

Source: Kanab Field Office Grazing Files

Rangeland health evaluations also contain an assessment of rangeland biotic integrity. Assessments are based on qualitative evaluations of indicators of an area's departure from anticipated ecological conditions, which are usually obtained from a representative site or ecological site description. Some indicators include functional/structural vegetation groups, plant mortality and decadence, annual production, presence of invasive plants, and reproductive capability. The ecologic condition and associated trends have been assessed on nearly 400 upland sites in the decision area (Table 3-6). On upland sites where functional status has been determined (99 percent of assessed sites), approximately 93 percent of sites are functioning properly. Of the 21 sites (5.4 percent of assessed sites) that are functioning at risk, 62 percent are not improving (static) or are decreasing in condition (static to downward and downward), comprising approximately 3 percent of all assessed sites. The dominant reason that sites are functioning at risk or trending downward is the encroachment of pinyon-juniper woodlands. Other reasons identified include the presence of cheatgrass and other invasive species, lack of species diversity, shrub die-off, and heavy wildlife use.

Table 3-6. Upland Functioning Condition

Functional Status	Trend	# of Sites	% Functioning at Risk	% Assessed Sites
Functioning at Risk	Downward	5	24	1.3
	Static to Downward	5	24	1.3
	Static	3	14	0.8
	Static to Upward	2	9	0.5
	Upward	0	0	0.0
	Unknown	6	29	1.5
Total Functioning at Risk		21	100.0	5.4
Functioning Properly		363	N/A	93.3
Unknown		5	N/A	1.3
Total		389	N/A	100

Source: Kanab Field Office Grazing Files

The following sections address each vegetation community listed in Table 3-4. Species compositions are noted, as well as general characteristics and current management issues for each community.

Aspen

Quaking aspen (*Populus tremuloides*) is the most widely distributed tree in North America. Although it has limited distribution in the decision area, it is an important vegetation community because of its value for wildlife habitat and high species diversity.

Aspen provide habitat for a wide variety of wildlife that needs young forests, including black bear, deer, elk, ruffed grouse, and a number of smaller birds and animals. Compared with conifer forests, aspen forests allow more surface water and/or groundwater recharge and streamflow because aspen forests have lower seasonal water losses to interception and transpiration. Aspen stands produce abundant forage that amounts to as much as 1,000–2,500 pounds per acre (1,100–2,800 kilograms per hectare) in the Rocky Mountains annually, or three to six times more than typical conifer stands. These amounts are comparable to forage production on some grasslands. Because of low fuel accumulations, aspen stands have low flammability and make excellent firebreaks (Little 1971).

Aspen may have a canopy cover of 30 to 60 percent. Canopy openings and mesic conditions allow lush understory vegetation to exist. Mountain snowberry (*Symphoricarpos oreophilus*) canopy cover ranges from 10 to 40 percent and is usually the dominant shrub in this association. Other understory vegetation includes Gambel oak (*Quercus gambelii*) and Wood's rose (*Rosa woodsii*). Aspen seedlings may also be present, but usually contribute less than 5 percent of woody species cover. Herbaceous cover is variable, but generally is dominated by bluegrass (*Poa pratensis*) and aspen bluebells (*Mertensia arizonica*). Blue wildrye (*Elymus glaucus*) and other wheatgrasses may also be present, as well as exotics (USGS 2004b).

Aspen forest types, which reproduce through suckering rootstock, need disturbance or dieback to stimulate regeneration (O'Brien and Waters 1998). In the absence of disturbance, areas once dominated by aspen have been converted to conifer or sagebrush vegetation types (Bartos and Campbell 1998). Although conifer invasion is a natural pattern, long-term fire suppression throughout Utah has resulted in an increased representation and dominance by conifer in aspen stands, thus reducing the extent of aspen-dominated stands (Mueggler 1989). Areas with small amounts of aspen in a stand may indicate that the area was once dominated by aspen (Bartos and Campbell 1998). "An approximately 60% decline in aspen dominated landscapes has occurred on National Forest System lands across Utah" (Bartos and Campbell 1998, p. 23). Aspen conditions throughout Utah are not expected to be different from those in the decision area.

Other

This category describes an aggregation of areas with small unconsolidated vegetation types that do not fit under other vegetation classifications. These areas may include sites planted for ungulate grazing or watershed protection, as well as small disturbed areas such as community pits.

Mixed Conifer

Mixed conifer vegetation communities within the planning area are dominated by two associations—white fir (*Abies concolor*) and Douglas fir (*Pseudotsuga menziesii*). Mixed conifer vegetation communities and associations are found within the planning area at elevations ranging from 5,000 to 8,500 feet. This mesic vegetation community generally occurs on steep, lower slopes and benches with northern aspects, and in narrow canyons and ravines. Its soils are generally deep, coarse-textured alluvium. Mixed conifer vegetation communities include upper montane/subalpine riparian forests, shrublands, and herbaceous riparian areas. These riparian areas are linear or patches confined to specific environments occurring on floodplains or terraces of rivers and streams. Shrubs found in these areas include thinleaf alder (*Alnus incana*), water birch (*Betula occidentalis*), red osier dogwood (*Cornus sericea*), coyote willow (*Salix exigua*), yellow willow (*S. lutea*), and mountain willow (*S. moniticola*) (Rondeau 2001, Welsh et al. 1993). Understory conditions vary widely from dry, open-canopy forests with grassy undergrowth on open slopes and ridges to moist, closed-canopied stands dominated by numerous herbaceous plants in the canyons and ravines.

The white fir association is well represented in the planning area, but is only slightly represented within the decision area. In the white fir association, white fir is well represented in the tree canopy, with height averaging 60 to 80 feet. The subcanopy is dominated by bigtooth maple (*Acer grandidentatum*) and other species contributing 30 to 70 percent of the total subcanopy and canopy cover, which may include Douglas fir, black maple (*Acer negundo*), and Gambel oak (*Quercus gambelii*). Subshrubs include creeping mahonia (*Mahonia repens*), mountain lover (*Paxistima myrsinites*), and mountain snowberry (*Symphoricarpos oreophilus*). The herbaceous layer may be diverse, but does not contribute significant groundcover.

In the mixed conifer Douglas fir association, Douglas fir is the dominant species in the canopy layer, represented by few to several mature trees. Mature western juniper (*Juniperus scopulorum*) is likely to be represented in the subcanopy by young trees and seedlings. At some sites, the subcanopy is dominated by Gambel oak (*Quercus gambelii*). The canopy and subcanopy species combined provide high foliar cover. Herbaceous cover is sparse and commonly represented by mesic forest species, starry false Solomon's seal (*Maianthemum stellatum*), Fendler's meadow rue (*Thalictrum fendleri*), and bracken fern (*Pteridium aquilinum*) (USGS 2004b).

Ponderosa Pine

Ponderosa pine (*Pinus ponderosa*) is the most widely distributed pine species in North America, ranging north to south from southern British Columbia to central Mexico and east to west from central Nebraska to the West Coast (Little 1971). In climax forests, ponderosa pine stands often contain many small, even-aged groups rather than a continuous uneven-aged structure. Ponderosa pine communities in central and southern Utah are usually the lowest in elevation of the coniferous forest types, and often border shrublands or pinyon-juniper (*Pinus edulis*–*Juniperus osteosperma*) woodlands. Dominant understory species include curleaf mountain-mahogany (*Cercocarpus ledifolius*), greenleaf manzanita (*Arctostaphylos patula*), black sagebrush (*Artemisia nova*), Gambel oak (*Quercus gambelii*), and mountain snowberry (*Symphoricarpos oreophilus*). Ponderosa pine and mountain muhly (*Muhlenbergia microsperma*) occur mainly in central and southern Utah (Youngblood and Mauk 1985).

In ponderosa pine forests, typical land uses are timber production, livestock grazing, and recreation, although no timber production occurs in the decision area. Ponderosa pine forests are found at low elevations, offering year-round recreation and providing habitats for various wildlife species. Snags in the mature pine forest provide a large number of species with nesting and roosting sites. Big game, such as deer and elk, also use the pine forests for food and shelter (Howard 2003).

Exclusion of frequent, low-intensity fires in ponderosa pine stands has resulted in a buildup of understory fuels in these stands. This change from natural disturbance regimes threatens ponderosa pine stands, which are resistant to low-intensity fire but susceptible to large crown fires. Understory fuels act as ladders, allowing fire to jump to the trees' crowns, resulting in the loss of ponderosa pine stands.

Oak/Mountain Shrub

There are two types of mountain shrub communities within the planning area—mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) and mixed mountain shrub. Their distribution depends on soil type, aspect, and elevation. Mountain big sagebrush communities extend from the upper edge of the pinyon-juniper woodlands to 10,000 feet. The soil is usually well drained, shallow, coarse-textured, and rocky. Mountain big sagebrush seldom exceeds 4 feet in height. On protected, north-facing slopes with sufficient soil moisture, aspen will invade, which in turn may be succeeded by shade-tolerant conifers.

Associated with mountain big sagebrush are rabbitbrush (*Chrysothamnus* spp.), bitterbrush (*Purshia tridentata*), and snowberry (*Symphoricarpos longiflorus*). Grasses are usually abundant. Grasses, shrubs, and forbs associated with mountain big sagebrush include bluebunch wheatgrass (*Elymus spicatus*), thickspike wheatgrass (*Elymus lanceolatus*), needle and thread grass (*Stipa comata*), muttongrass (*Poa fendleriana*), sandberg bluegrass (*Poa secunda*), sheep fescue (*Festuca ovina*), mountain low rabbitbrush (*Chrysothamnus viscidiflorus lanceolatus*), arrowleaf balsamroot (*Balsamorhiza sagittata*), and lupine (*Lupinus* spp.)

The mixed mountain shrub community is found at elevations ranging from 7,000 to 8,500 feet. It is typically found on soils with dark-colored surface horizons where roots can grow deep. This community

is more diverse on protected slopes where the force of the wind is moderated. Common shrubs include true mountain mahogany (*Cercocarpus montanus*), Utah serviceberry (*Amelanchier utahensis*), chokecherry (*Prunus virginiana*), snowberry (*Symphocarpus longiflorus*), mountain big sage (*Artemisia tridentata* ssp. *vaseyana*), squawbush (*Rhus trilobata*), squaw current (*Ribes cereum*), and Mormon tea (*Ephedra* spp.). Common grasses and forbs include needle and thread grass (*Stipa comata*), mutton grass (*Poa fendleriana*), junegrass (*Koeleria macrantha*), mountain brome (*Bromus carinatus*), fescue grasses (*Festuca* spp.), arrowleaf balsam root (*Balsamorhiza sagittata*), scarlet gilia (*Gilia aggregate*), and lupine (*Lupinus* spp.).

Desert Scrub

Desert scrub vegetation communities range from southeastern Oregon into Utah and Nevada where annual precipitation is usually less than 10 inches (25 cm). Typically, this vegetation community and associations occupy the driest regions of the planning area. Structural and compositional variations in this habitat are related to changes in salinity and fluctuations in the water table and can be described as occurring in two vegetation associations—saltbush and salt desert scrub.

The saltbush vegetation association may be the most arid vegetation type in the intermountain west (Knight 1994). These areas are characterized by accumulations of salt in poorly developed deep soils. Soils in these areas usually have a pH of 7.8 to 9, which restricts the uptake of water by all but the most salt-tolerant plants (halophytes). Halophytes function essentially to redistribute salts from the soil depths to the surface, thereby concentrating salts around the perimeter of the plant. This enables the plant to eliminate competition for scarce water and nutrients from other less salt-tolerant plants (Goodin and Mozafar 1972).

The salt desert scrub association is characterized by drought-tolerant shrubs, with few grasses and forbs in the understory. The soils in these areas are shallow saline clays and loams. Typical shrubs in these vegetation types are shadescale (*Atriplex confertifolia*), fourwing saltbush (*Atriplex canescens*), spiny hopsage (*Grayia spinosa*), greasewood (*Sarcobatus vermiculatus*), winterfat (*Ceratoides lanata*), broom snakeweed (*Gutierrezia sarothrae*), and bud sagebrush (*Picrothamnus desertorum*) (USGS 2004b).

Desert scrub areas also include greasewood flats—ephemeral wet meadows. These areas can be large patches defined by hydrologic regime, soil salinity, and texture. Shrubs and grasses associated with these areas include salt grass (*Distichlis spicata*), common spikerush (*Eleocharis palustris*), alkali sacaton (*Sporobolus airoides*), and greasewood species (*Sarcobatus* spp.).

Non-Vegetated

Non-vegetated lands consist of areas with less than 30 percent vegetation cover. These areas include lava outcrops, canyon cliffs, and sparsely vegetated sand dunes. Volcanic areas are mostly exposed rock (usually greater than 90 percent of the surface, with sparse alpine vegetation). These areas are typically less than 1 acre in size and are located at upper elevations in the northwest portion of the decision area.

Lava outcrops occur throughout the intermountain west and are limited to non-vegetated and sparsely vegetated volcanic substrates (generally less than 10 percent plant cover) such as basalt lava, basalt dikes, and basalt cliff faces with associated loose deposits of rock debris (USGS 2004a).

Colorado Plateau cliffs, talus slopes, and canyons are present in the foothills and up to subalpine elevations, and include non-vegetated and sparsely vegetated landscapes (generally less than 10 percent plant cover) of steep cliff faces, narrow canyons, and smaller rock outcrops of various igneous or sedimentary rocks. The Colorado Plateau cliffs and canyons are composed largely of exposed bedrock

(usually sedimentary) and scree; whereas the Rocky Mountain cliffs and canyons are composed of various igneous, sedimentary, and metamorphic rocks (USGS 2004a).

Active and stabilized sand dune areas are located primarily in the southwestern portion of the decision area. These sand areas have sparse to moderate vegetation adapted to unstable coarse sands (USGS 2004a). The soil supporting the vegetation is unconsolidated windblown sand on active dunes. The surrounding habitat is either vegetated, stabilized sand, sandstone slickrock, or various exposed shales and other fine-grained exposed geologic rock types or finer-grained developed soils. Plants associated with these sand dunes include sand mulesears (*Wvethia scabrida* var. *attenuata*), blowout grass (*Redfieldia flexuosa*), sand dropseed (*Sporobolus cryptandrus*), giant dropseed (*Sporobolus giganteus*), Indian ricegrass (*Achnatherum hymenoides*), sandhill muhly (*Muhlenbergia pungens*), silky sophora (*Sophora nuttalliana*), Kanab yucca (*Yucca kanabensis*), rubber rabbitbrush (*Chrysothamnus nauseosus*), winged wild-buckwheat (*Eriogonum alatum*), ponderosa pine (*Pinus ponderosa*), pinyon pine (*Pinus edulis*), Utah juniper (*Juniperus osteosperma*), and Welsh's milkweed (*Asclepias welshii*) (USFWS 1992).

Sagebrush Steppe

Sagebrush steppe vegetation communities and associations are common in Utah, Washington, Oregon, Idaho, and adjacent Wyoming, and Nevada. Sagebrush steppes, found mostly at elevations between 2,000 and 6,000 feet, are a major vegetation community in the decision area and are usually interspersed with pinyon-juniper woodlands and desert scrub vegetation communities. A functioning sagebrush steppe is a mosaic patchwork of vegetation states (seral diversity) that can range from recovering perennial grass-shrublands following natural fire, to multi-aged sagebrush with a small pinyon-juniper component, to old-growth, decadent sagebrush steppe with high canopy cover and reduced herbaceous understory (Wyoming Interagency Vegetation Committee 2002).

Sagebrush steppe communities include a diversity of vegetation states (seral diversity); that is, sagebrush steppe communities are not limited to those dominated only by sagebrush. Areas dominated by perennial grasslands (native) and areas with recent sagebrush seedings may be considered the early vegetation state in the sagebrush steppe. In addition, many areas now dominated by Utah juniper (*Juniperus osteosperma*) and pinyon pine (*Pinus edulis*) are sagebrush steppe with a prolonged absence of disturbance.

Shrubs typically provide 10 to 60 percent of the vegetation cover in undisturbed conditions. Vegetation structure in this community is characterized by an open shrub layer over a moderately open to closed bunchgrass layer. The more productive sites generally have a denser grass layer and sparser shrub layer than more xeric sites. The bunchgrass layer may contain a variety of forbs. Sagebrush steppe vegetation communities generally have relatively little exposed bare ground, and mosses and lichens may carpet the area between taller plants. Moist sites may support tall bunchgrasses greater than 3.3 feet in height or rhizomatous grasses (IBIS 2004).

Characteristic and dominant mid-tall shrubs in the shrub-steppe habitat include basin sagebrush (*Artemisia tridentata* ssp. *tridentata*), Wyoming sagebrush (*A.t.* ssp. *wyomingensis*), mountain sagebrush (*A.t.* ssp. *vaseyana*), antelope bitterbrush (*Purshia tridentata*), and silver sagebrush (*A. cana*). Each of these species can be the only shrub or appear in complex seral conditions with other shrubs. Rabbitbrush (*Chrysothamnus viscidiflorus*) and short-spine horsebrush (*Tetradymia spinosa*) are common associates and often dominate sites after disturbance. Big sagebrush occurs with the shorter stiff sagebrush (*A. rigida*) or low sagebrush (*A. arbuscula*) on shallow soils or high-elevation sites (IBIS 2004). Moisture and temperature control movement of sagebrush species within their range.

The sagebrush steppe community comprises approximately 26 percent of the decision area. It is estimated that during pre-settlement times sagebrush comprised as much as 72 percent of the decision area (Table

3-8). In the past 150 years the extent of sagebrush steppe has been greatly reduced because the natural disturbance regimes have been altered. This is largely attributed to the lack of regular disturbance because of organized fire suppression, removal of fine fuels that results from livestock grazing, and subsequent encroachment by pinyon-juniper woodlands.

Pinyon-Juniper Woodland

Pinyon-juniper woodlands are the most widely distributed and largest vegetation community in the decision area, comprising approximately 59 percent of vegetation cover. This community generally occurs on a variety of slopes and aspects and its soils are usually coarse-texture, calcareous alluvium derived from sandstone and shale. They comprise both closed and open woodlands. Increases in canopy cover result in significant amounts of bare ground, litter, and desert pavement at the soil surface (USGS 2004b). On lower edges of the woodland zone, Utah juniper is frequently the only tree species. Utah juniper is more xeric than pinyon pine, and often serves as nurse tree for pinyons in well-developed forests. The undergrowth is variable and dependent on canopy closure, soil texture, elevation, and aspect (Welsh et al. 1993). In healthy pinyon-and juniper woodland communities, the average canopy height ranges from 15 to 30 feet.

The health and relative density of pinyon and juniper vary widely within the decision area; however, canopy densities greater than 50 percent occur over large areas. Pinyon pine and Utah juniper vigorously compete with other plants for available soil water, crowding out grasses and shrubs that usually are present as understory vegetation. The lack of protective vegetative cover in pinyon-juniper stands leaves the soil surface particularly susceptible to erosion.

The vegetation is dominated by Utah juniper (*Juniperus osteosperma*) and pinyon pine (*Pinus edulis*), with sagebrush (*Artemisia* spp.) dominating the sparse to moderately dense short-shrub layer. Other shrubs, such as fourwing saltbush (*Atriplex canescens*), shadscale (*Atriplex confertifolia*), yellow rabbitbrush (*Chrysothamnus viscidiflorus*), Mormon tea (*Ephedra* spp.), rubber rabbitbrush (*Ericameria nauseosa*), broom snakeweed (*Gutierrezia sarothrae*), prickly pear (*Opuntia* spp.), or cliffrose (*Purshia* spp.) may be present with low percent cover. The sparse to moderately dense herbaceous layer is dominated by graminoids, such as indian ricegrass (*Achnatherum hymenoides*), three-awn (*Aristida* spp.), grama (*Bouteloua* spp.), threadleaf sedge (*Carex filifolia*), bottlebrush squirreltail (*Elymus elymoides*), needle-and-thread grass (*Hesperostipa comata*), galleta (*Pleuraphis jamesii* (*Hilaria jamesii*)), western wheatgrass (*Pascopyrum smithii*), Sandberg's bluegrass (*Poa secunda*), bluebunch wheatgrass (*Elymus spicatus*), dropseed (*Sporobolus* spp.), and introduced annuals including cheatgrass (*Bromus tectorum*). Associated forbs may include fringed sagebrush (*Artemisia frigida*), buckwheat (*Eriogonum* spp.), carpet phlox (*Phlox hoodii*), and Purshes' plantain (*Plantago patagonica*) (USGS 2004b).

Pinyon-juniper woodlands areas also include lower montane riparian woodlands. These are linear areas or patches that occur primarily at the lowest elevations. The areas are dependent on the natural hydrologic regime and flooding, and are often found near wet meadows. Shrubs associated with these riparian areas include skunkbrush (*Rhus aromatica* var. *trilobata*) and narrowleaf willow (*Salix exigua*) (Rondeau 2001, Welsh et al. 1993).

Pinyon-juniper woodland species are long-lived; pinyon pine can exceed 600 years in age and juniper can exceed 1,000 years in age (Monson and Stevens 1999). Based on tree-age data collected through the U.S. Forest Service Forest Inventory and Analysis, approximately 90 percent of pinyon-juniper woodlands in the decision area are less than 150 years old. It is estimated that pinyon-juniper woodlands throughout the intermountain west have increased 10-fold over the past 150 years (Miller and Tausch 2001). Monitoring data indicate that approximately 80 percent of the areas classified as pinyon-juniper woodlands in the decision area are functioning outside of their pre-European-settlement ranges (Table 3-8). This increase

in pinyon-juniper woodlands is attributed to historic land use practices, such as fire suppression, reduction of fine fuels, and climatic variations (Miller and Tausch 2001, Yorks et al. 1994, Brockway et al. 2002, Belsky 1996).

The reduction of fine fuels and increases in fire return intervals have resulted in pinyon encroachment, leading to large acreages of closed-canopy pinyon-juniper in formerly treeless areas (Brockway et al. 2002). As a result, structural vegetation stages are weighted to more acres and denser pinyon-juniper stands than conditions before European settlement. The reversibility of this expansion depends on site-specific factors such as the extent and duration of alteration from the previous vegetation state. Vegetation treatments have been conducted with success within the decision area to restore sagebrush steppe ecosystems on which pinyon-juniper woodlands have encroached.

Old-growth pinyon and juniper can be characterized by rounded, spreading canopies; large basal branches; large, irregular trunks; and furrowed, fibrous bark (Miller and Rose 1999). These old-growth stands are often restricted to steep, dissected, and rocky terrain and thin substrates along ridges. Throughout the west old-growth pinyon-juniper woodlands are estimated to comprise less than 10 percent of the current area classified as pinyon-juniper woodlands (Miller and Tausch 2001). Based on inventory data, it is estimated that these old-growth stands exist on approximately 63,000 acres (11 percent) within the decision area.

Plant and Seed Collection

There has been limited demand for the collection and sale of live plants and live plant seed over the past decade. Generally, this limited demand has focused on collection of live Utah juniper (*Juniperus osteosperma*), pinyon pine (*Pinus edulis*), and sagebrush (*Artemisia* spp.). Seed collection has mainly included sagebrush (*Artemisia* spp.), fourwing saltbush (*Atriplex canescens*), and winterfat (*Ceratoides lanata*). The seed collection policy for public lands in Utah requires verification of good vegetative condition (e.g., species vigor, root reserves, viable seed, seed abundance) before a seed collection permit is issued. Availability of live plants and seed for collection varies based on climatic fluctuation and could be precluded during drought years to maintain vegetation community health. Based on historic demand for plants and seed, vegetation communities provide ample opportunities to meet continued demand for plant and seed collection. However, there has been increased interest in native plant and seed collection to support landscaping. Table 3-7 shows the amount of plant and seed collection over the past 3 years.

Table 3-7. Plant and Seed Collection – FY04 through FY06

Vegetation Type	2004		2005		2006	
	Units	Total Cost	Units	Total Cost	Units	Total Cost
Live Plants (# of plants)	4	\$20.00	11	\$34.00	20	\$60.00
Seeds: (Total pounds)	0	\$0	0	\$0	510	\$51.00
Sagebrush (pounds of seed)	0	\$0	0	\$0	200	\$20.00
Fourwing Saltbush (pounds of seed)	0	\$0	0	\$0	300	\$30.00
Winterfat (pounds of seed)	0	\$0	0	\$0	10	\$1.00

Source: Kanab Field Office Files

Disturbance Regimes

Many areas in the decision area have not been functioning within their historic fire/disturbance regimes. As noted above, changes to the fire/disturbance regimes have altered the distribution and health of aspen, ponderosa pine, sagebrush steppe, and pinyon-juniper woodlands across the landscape. In the absence of disturbance, areas once dominated by aspen have been converted to conifers or sagebrush (Bartos and Campbell 1998). Exclusion of frequent, low-intensity fires in ponderosa pine stands threatens these stands with stand-replacing crown fires due to the presence of abundant ladder fuels. Removing regular disturbances from the sagebrush steppe has resulted in the encroachment of pinyon-juniper woodlands and the increasing decadence of existing sagebrush. As a result, many of these vegetation communities are not ecologically stable. Communities are considered stable when they can withstand and/or recover from disturbance.

Existing vegetation distribution across the landscape was analyzed based on changes over the past 150 years. Table 3-8 identifies the existing vegetation acres, the estimated historic (pre-European settlement) acres based on the historic fire/disturbance regimes, and the estimated acres disturbed every 20 years (current planning window) based on those regimes (at both the upper and lower extents of the ranges).

Table 3-8. Vegetation Departure from Historic and Estimated Disturbance Acreages

Vegetation Estimated Departure from Historic					Estimated Disturbance Acres		
Class Name	Existing Acreages	% of Total	Estimated Historic Acreages	% of Total	Historic Fire Regime (years)	Acres Disturbed (20 years) Frequent Return	Acres Disturbed (20 years) Infrequent Return
Non-Vegetated	40,200	7	40,200	7	N/A	0	0
Other	700	<1	700	<1	N/A	0	0
Desert Scrub	22,200	4	22,200	4	N/A	0	0
Mixed Conifer	550	<1	400	<1	100-300	70	10
Aspen	350	<1	1,200	<1	25-100	930	290
Ponderosa Pine	4,200	<1	5,400	1	5-25	21,400	4,300
Oak/Mountain Shrub	15,100	3	20,300	4	25-100	16,000	4,000
Pinyon-Juniper Woodland	324,800	59	62,000	11	200-300	6,000	4,100
Sagebrush Steppe	145,900	26	401,600	72	20-100	401,600	80,300
Total	554,000		554,000			446,000	93,000

Note: All acres apply to the decision area only.

Sources: USGS 2004a; BLM 2005c; Fule et al. 1997; Harrington 1985

Riparian/Wetland

Wetland areas (Map 3-7) are defined by federal policy as areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and which, under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. BLM Technical Reference 1737 (Riparian-Wetland Area Management) includes marshes, shallow swamps, lakeshores, bogs, wet meadows, and riparian areas as wetlands. Riparian areas are further defined by BLM Technical Reference 1737 as a form of wetland transition between permanently

saturated wetlands and uplands areas. These areas exhibit vegetation or physical characteristics reflective of permanent surface or subsurface water influence. Lands along, adjacent to, or contiguous with perennially and intermittently flowing rivers and streams, and shores of lakes and reservoirs with stable water levels are typical riparian areas. Excluded are such sites as ephemeral streams or washes that do not exhibit the presence of vegetation dependent on free water in the soil.

Although riparian and wetland areas occupy only a small percentage of land, they provide a wide range of functions critical to different wildlife species, water quality, scenery, soil conservation, and recreation (Brimson 2001). The distribution of riparian and wetlands areas is documented on SWReGAP vegetation maps, on National Wetland Inventory maps, and on decision area specific maps of wetland (lentic) and stream (lotic) resources. The SWReGAP vegetation cover types associated with riparian and wetlands areas are grass- or forb-dominated wetlands, forested wetlands, and shrub-dominated wetlands. The 70.64 miles and 385.54 acres of riparian and wetland areas within the decision area occur primarily in the Sevier River, East Fork Virgin River, and Kanab Creek drainages. Wetlands are afforded protection under Executive Order (EO) 11990 (wetland protection), EO 11988 (floodplain management), and Section 404 of the Clean Water Act.

Riparian areas in the decision area are dominated by wetland species such as Fremont cottonwood (*Populus fremontii*), velvet ash (*Fraxinus velutina*), box elder (*Acer negundo*), and the introduced tamarisk (*Tamarix chinensis*) and Russian olive (*Elaeagnus angustifolia*). Riparian and wetland areas may be dominated by herbaceous or shrub species such as Baltic rush (*Juncus balticus*), Nebraska sedge (*Carex nebraskensis*), seepwillow (*Baccharis emoryi*), and sandbar willow (*Salix exigua*). Some of these riparian forests and woodlands lack understories or are dominated by nonnative species (USGS 2004b).

The Riparian-Wetland Initiative for the 1990s (BLM 1991a) establishes goals and objectives for managing riparian-wetland resources on public lands and includes a strategy to focus management on entire watersheds. The Utah BLM Riparian Management Policy (IM-UT-2005-091) is tiered to this overall national strategy with objectives to “identify, maintain, restore, and/or improve riparian values to achieve a healthy and productive ecological condition...in order to provide watershed protection while still preserving quality riparian dependent aquatic and terrestrial species habitats and, as appropriate, allow for reasonable resource uses.” The *Utah Standards for Rangeland Health* (BLM 1997a) also contain ecologically based riparian standards that must be met, or toward which riparian conditions must be progressing. The ecological condition of riparian-wetland areas is measured using proper functioning condition (PFC) assessments. PFC assessments provide a consistent approach for considering hydrology, vegetation, and erosion/deposition (soils) attributes and processes to assess the condition of riparian-wetland areas (USDOI 1998, USDOI 1999). A PFC assessment is a qualitative assessment based on quantitative science to determine how well a riparian-wetland area’s physical processes are functioning. PFC is a state of resiliency that allows an area to produce desired values, such as fish habitat, neotropical bird habitat, or forage, over time. Riparian-wetland areas that are not functioning properly cannot sustain these values. Table 3-9 shows the existing condition and trend of the decision area’s riparian-wetland areas. Although more than 28 miles (more than 39 percent of assessed mileage) of riparian-wetland miles are functioning at risk, only 1.2 miles are in a downward trend, and most are improving in condition. More than 233 acres (60 percent of assessed acres) of riparian-wetland acres are in proper functioning condition. Of all assessed riparian-wetland acreage, approximately 16 acres (4.2 percent of assessed acres) are non-functioning or functioning at risk in a downward trend. Of all assessed riparian-wetland mileage, approximately 7 miles (10.2 percent of assessed mileage) are non-functioning or functioning at risk in a downward trend.

Table 3-9. Decision Area Riparian Condition

Functional Status	Trend	Miles Evaluated	% of Miles Evaluated	Acres Evaluated	% of Acres Evaluated
Non Functioning	N/A	6	8.5	5.83	1.5
Functioning at Risk	Downward	1.2	1.7	10.3	2.7
	Static	1.99	2.8	9.05	2.3
	Static to Upward	1.75	2.5	23.25	6.0
	Upward	21.15	29.9	90.75	23.5
	Unknown	2	2.8	10.2	2.6
Proper Functioning Condition	N/A	36.22	51.3	233.16	60.5
Unknown	N/A	0.33	0.5	3	0.8
Total		70.64	100	385.54	100

Source: Kanab Field Office Riparian-Wetland Files

Relict Vegetation

There are two known areas of relict plant communities in the decision area, Elephant Butte and Diana's Throne (Map 3-4). Relict plant communities contain unique vegetation assemblages representative of vegetation communities that have not been historically affected by historic human actions such as livestock grazing, fire suppression, or surface-disturbing actions. The unique quality of these areas is directly related to their isolation over time or their lack of disturbance. This isolation also provides an opportunity to gauge impacts occurring elsewhere in the decision area and on the Colorado Plateau. These areas have potential value for scientific study and for comparison with similar communities that have been affected by historic human activities.

Invasive Species/Noxious Weeds

Invasive species are nonnative plants that have adaptive characteristics such as high seed production; are aggressive and difficult to manage; are capable of invading native habitats; and can often significantly change vegetation communities and affect ecological relationships. Noxious weeds are a subset of invasive plant species. They are legally designated by state or federal law to have these characteristics and require prevention and control measures to help contain or eradicate them. Seventeen species of state or county listed noxious weeds are currently known to occur within the boundary of the planning area (in Kane and Garfield counties). Weed infestations usually occur on disturbed areas where native vegetation has been significantly or totally removed (e.g., roadsides, livestock trails, reservoir sites, and flood damaged areas). Noxious weeds and invasive species often exclude other vegetation, reducing species diversity. If unrestricted, noxious weeds and invasive species may threaten to occupy additional acreage of public and private lands. The BLM is required by law to control noxious weeds (Federal Noxious Weed Act of 1974 [PL 93-629] as amended).

The Kanab field office works closely with the Color Country Cooperative Weed Management Area and Kane and Garfield County weed coordinators to identify and monitor infested areas and determine the needed treatment and control methods. Active control measures are taken on the following species on public lands: Scotch thistle (approximately 1,000 acres in Kane County), musk thistle (approximately 500 acres in Panguitch Valley), spotted knapweed (approximately 20 acres in Kane County) and hoary cress (less than 100 acres in Panguitch Valley). These acreages generally have small, dispersed populations of noxious weeds that are not normally contiguous. Because most of the infestations are small, the primary method of control has been spraying with herbicides and hand grubbing. Table 3-10 shows acres of weed

treatments throughout the decision area for the past 5 years. The increase in acres in FY 2002 was due to the identification of new populations, not to the expansion of existing infestations. Due to treatments, noxious weed populations are stable.

Table 3-10. Acres of Weed Treatments

Fiscal Year (FY)	Acres Treated
FY00	1,000
FY01	1,000
FY02	1,552
FY03	1,500
FY04	1,500

Source: Kanab Field Office Files

Table 3-11 lists the common and scientific names of noxious weeds listed by the Utah State Department of Agriculture and Food for Garfield and Kane counties. The distribution and extent of areas with noxious weed populations are well documented.

Table 3-11. Utah Noxious Weed List

Common Name	Scientific Name
Bermuda grass	<i>Cynodon dactylon</i>
Canada thistle	<i>Cirsium arvense</i>
Diffuse knapweed	<i>Centaurea diffusa</i>
Dyers woad	<i>Isatis tinctoria</i> L.
Field bindweed	<i>Convolvulus arvensis</i>
Hoary cress	<i>Cardaria drabe</i>
Johnsongrass	<i>Sorghum halepense</i>
Leafy spurge	<i>Euphorbia esula</i>
Medusahead	<i>Taeniatherum caput-medusae</i>
Musk thistle	<i>Carduus mutans</i>
Perennial pepperweed	<i>Lepidium latifolium</i>
Perennial sorghum	<i>Sorghum halepense</i> L. and <i>S. alnum</i>
Purple loosestrife	<i>Lythrum salicaria</i> L.
Quackgrass	<i>Agropyron repens</i>
Russian knapweed	<i>Centaurea repens</i>
Scotch thistle	<i>Onopordum acanthium</i>
Spotted knapweed	<i>Centaurea maculosa</i>
Squarrose knapweed	<i>Centaurea squarrosa</i>
Yellow starthistle	<i>Centaurea solstitialis</i>

Source: Utah Department of Agriculture and Food 2005

In addition to the listed noxious weeds, there are several plant species that occur in the planning area that are considered undesirable. A plant is usually labeled undesirable when it presents a poisoning threat to livestock. Some undesirable plants occur as part of the natural vegetative community. Others invade or increase as a result of poor rangeland conditions. It is not feasible to attempt control of most undesirable

species because they are common and widespread; however, livestock management techniques can be used to prevent or minimize livestock losses. Regionally, locoweed (*Astragalus* spp.) has accounted for most of the reported livestock poisonings. Locoweed is an episodic problem. In years when it is abundant before other range forage species greenup, it can become a problem to livestock. For example, in 1993 and 1994, there was considerable loss of calves to locoweed poisoning in Utah. Other livestock losses have been attributed to death camas (*Zigadenus* spp.), rubberweed (*Hymenoxys* spp.), cocklebur (*Xanthium strumarium*), whorled milkweed (*Asclepias subverticillata*), and Gambel oak (*Quercus gambelii*).

Changes to the noxious weed list occur as new plant species become problems. It should be noted that a species' absence from the list does not mean that the species is not considered in management decisions. For example, although cheatgrass is not on the list, it has become a management concern throughout the region because, once cheatgrass is established on a site over just a few cycles of seed production and dispersal, the seed bank can contain two or three times as many viable cheatgrass seeds as there are established plants in the community (Zouhar 2003). Cheatgrass invasion may be accelerated by disturbance, but disturbance is not required for cheatgrass to become established. Cheatgrass can also thrive in areas that have little or no history of cultivation or grazing by domestic livestock. It can become established in these relatively undisturbed areas when seed disperses from nearby patches and establishes on sites of small natural disturbances, such as where rodents or predators dig in the soil (Zouhar 2003). Cheatgrass is more of a concern in the southern half of the decision area. In Garfield County, cheatgrass invasion and spread is limited by long cool spring months and higher elevations.

3.2.6 Special Status Species (Threatened, Endangered, and Sensitive)

Special status species include both animals and plants that require specific management attention as a result of population or habitat concerns. The five categories of these species are the following:

- Federally Listed Threatened and Endangered Species and Designated Critical Habitats
- Federally Proposed Species and Proposed Critical Habitats
- Federal Candidate Species
- BLM Sensitive Species
- State of Utah listed or sensitive species.

Federally listed species may have critical habitat identified as crucial to species viability. For those species that are listed and have not had critical habitat designations identified for them, the BLM cooperates with the United States Fish and Wildlife Service (USFWS) to determine, identify, and manage habitats of importance. The mission of the USFWS is to work with other federal, state, and local agencies to conserve, protect, and enhance fish, wildlife, and plant species and their habitats. Protective measures for migratory birds are provided in accordance with the Migratory Bird Treaty Act of 1918 and the Bald Eagle Protection Act of 1940. Other fish and wildlife resources are considered under the Fish and Wildlife Coordination Act (1934).

The BLM has entered into a memorandum of agreement (MOA) with the USFWS to improve the efficiency and effectiveness of RMP-level Section 7 consultation processes under the Endangered Species Act (ESA). Through this MOA, the BLM agrees to promote the conservation of candidate, proposed, and listed species and to informally and formally consult on listed and proposed species and designated and proposed critical habitat during planning to protect and improve the condition of species and their habitats to a point where their special status is no longer necessary.

Threatened and Endangered Species

The BLM will continue to implement actions that will further the management, protection, and recovery of listed and non-listed special status plant and animal species. The BLM accomplishes this management through coordination with the USFWS, the Utah Division of Wildlife Resources (UDWR), and others. The BLM will initiate Section 7 consultation with USFWS before approving or implementing any action that may affect listed species or designated critical habitat. Habitat for these species will be managed in such a manner that actions authorized, funded, or carried out by the BLM do not contribute to the need for the species to become listed under the ESA. Table 3-12 identifies the federally listed animal and plant species in the decision area. It should be noted that although suitable habitat may be present, some of these species may not be known to actually occur within the decision area.

Table 3-12. Federally Listed Animal and Plant Species

Common Name	Scientific Name	Status
Birds		
Bald Eagle	<i>Haliaeetus leucocephalus</i>	Threatened
California Condor	<i>Gymnogyps californianus</i>	Experimental
Mexican Spotted Owl	<i>Strix occidentalis</i>	Threatened
Southwestern Willow Flycatcher	<i>Empidonax traillii extimus</i>	Endangered
Western Yellow-Billed Cuckoo	<i>Coccyzus americanus occidentalis</i>	Candidate
Mammals		
Utah Prairie Dog	<i>Cynomys parvidens</i>	Threatened
Invertebrates		
Kanab Ambersnail	<i>Oxyloma kanabense</i>	Endangered
Coral Pink Sand Dunes Tiger Beetle	<i>Cicindela limbata albissima</i>	Candidate
Plants		
Autumn Buttercup	<i>Ranunculus aestivalis</i>	Endangered
Siler Pincushion Cactus	<i>Pediocactus sileri</i>	Threatened
Welsh's Milkweed	<i>Asclepias welshii</i>	Threatened

Source: USFWS 2005

Bald Eagle (*Haliaeetus leucocephalus*), the national symbol of the United States, was first protected under the Bald Eagle Protection Act of 1940, then listed as an endangered species in most of the lower 48 states in 1966 and again in 1973. Because it was listed in 1973, the bald eagle population has clearly increased in number and expanded in range throughout the contiguous 48 states. During a survey in January 2002, approximately 22 bald eagles were counted along the Sevier River within Kane and Garfield counties—17 adults and 5 immatures (BLM 2002c). The increase is a direct result of the ban on the use of DDT and other persistent organochlorines, habitat protection, and other recovery efforts. In 1995 the USFWS reclassified the bald eagle under the ESA from endangered to threatened in the lower 48 states (*Federal Register* 50 CFR, part 17, vol. 60, no. 133). The bald eagle was removed from the list of threatened and endangered species by the USFWS in June 2007.

The bald eagle is found throughout Utah and more often during the winter than the summer. Habitat consists of communal winter roosting habitat and foraging habitat within the planning area. Feeding areas, diurnal perches, and night roosts are fundamental elements of bald eagle winter range. In Utah, eagles nest in mature cottonwoods. Wintering habitat exists within both Garfield and Kane counties. Fish and waterfowl are the primary sources of food for bald eagles, but they also will feed on rabbits, carrion, and

small rodents. Bald eagles that winter in Utah number in the thousands, but the nesting population (9 active nests in 2005) has not reached the recovery goal of 10 (UDWR 2005a). There is 1 confirmed bald eagle nest within the planning area located west of the town of Alton along US Highway 89; the nest is within the planning area, but is outside the decision area. Threats to the species include loss of lowland riparian habitats, which serve as both nest and roost habitat, as well as nest and roost abandonment that results from excessive human disturbance (UDWR 2005a).

California Condor (*Gymnogyps californianus*) was listed as endangered on March 11, 1967, and noted to occur only in California. On October 16, 1996, the USFWS announced plans to reintroduce California condors into northern Arizona and southern Utah and to designate these birds as nonessential experimental populations as provided by Section 10j of the ESA. *Federal Register* Notice vol. 61, no. 201, pages 54044–54060 further directs the establishment of a nonessential experimental population of California condors in northern Arizona. The purpose of the reintroduction was to achieve the primary recovery goal of establishing a second noncaptive population that is spatially separated from the non-captive population in southern California.

California condors are among the largest flying birds in the world. Adults weigh as much as 22 pounds. They are black except for prominent white underwing linings and white edges on the upper secondary coverts. Condors are opportunistic scavengers, feeding only on carcasses. Since European settlement of California, condor populations have steadily declined. Poisoning, shooting, egg and specimen collecting, collisions with man-made structures, and loss of habitat contributed to the decline of the species. By 1987, the last wild condor was captured and taken to San Diego Wild Animal Park. Beginning with the first successful breeding of California condors in 1988, the population (in 1996) was 121, including 104 in the captive flock and 17 in the wild. The nonessential experimental status of this condor population places the following requirements on federal agencies: (1) that agencies use their authorities to conserve the condors and (2) for the purposes of Section 7 consultation, they are treated as if they are proposed for listing; therefore, the BLM will informally confer with the USFWS on actions likely to jeopardize the continued existence of the condor (50 CFR Part 17, FR vol. 61, No. 201, pages 54044–54060).

Birds from northern Arizona frequently forage and roost in Utah and are likely to nest in southern Utah (UDWR 2005a). To date there are no known California condor nesting or roosting sites within the decision area. However, recent surveys have identified roosting sites next to Zion National Park on the Kolob Terrace adjacent to the decision area (Parish 2005). Access to these roosting sites would likely require the California condor to fly over the decision area. Threats to the condors include inadequate protection of suitable nesting sites as well as foraging areas near nesting sites (UDWR 2005a).

Mexican Spotted Owl (*Strix occidentalis lucida*) was listed as a threatened species on April 15, 1993 (USFWS 1993). The range of the Mexican spotted owl extends from the southern Rocky Mountains in Colorado and the Colorado Plateau in central and southern Utah, southward through Arizona and New Mexico and into northern Mexico. Mexican spotted owls forage primarily at night, their diet consisting of a variety of mammals, birds, reptiles, and insects, with mammals making up the bulk of the diet throughout the owls' range. Wood rats, voles, and gophers are the primary mammal food base. Steep slopes and canyons with rocky cliffs characterize much of the owl's habitat in the planning area (Map 3-8).

A recovery plan was completed for the Mexican spotted owl in 1995 (USFWS 1995) and a revised recovery plan is currently being developed. Threats to Mexican spotted owls include loss and fragmentation of mixed-conifer, riparian and ponderosa pine habitats, as well as human disturbance that leads to nest or site abandonment or disruption of breeding (UDWR 2005a).

Designated critical habitat was established for this species in 2001 and revised in 2004 (USFWS 2004). There are approximately 47,700 acres of designated critical habitat in the decision area, located on the decision area's western boundary adjacent to Zion National Park and southeast of the town of Tropic (Map 3-8). However, not all of these acres contain the primary constituent elements of habitat as described in the recovery plan. The critical habitat designation clarified that areas within critical habitat boundaries are considered critical only when they contain or have the potential to contain habitat characteristics essential to the conservation of the species. For canyon habitats, the primary constituent elements include one or more of the following attributes: (1) cooler and often more humid conditions than the surrounding area, (2) clumps or stringers of trees and/or canyon walls with crevices, ledges or caves, (3) high percent of ground litter and woody debris, and (4) riparian or woody vegetation. The primary constituent elements related to forest structure include (1) a range of tree species, (2) a shade canopy created by the tree branches covering 40 percent or more of the ground, and (3) large dead trees with a trunk diameter of at least 12 inches (*Federal Register* 69 CFR 53181-5398).

Southwestern Willow Flycatcher (*Empidonax traillii extimus*) was listed as an endangered species in 1995. This bird is a neotropical migrant, which breeds primarily in the southwestern United States and winters in Central America and southern Mexico. In Utah, only three breeding sites (all near St. George) have been confirmed, although areas of probable breeding occur across the southern Utah counties (UDWR 2005a). Current range limits of the Southwestern willow flycatcher in Utah are not definitively known (Bosworth 2003). Critical habitat was designated in 2005; no critical habitat is present in the planning area (*Federal Register* vol. 70, no. 201). However, potentially suitable habitat for this species exists in Garfield and Kane counties. The species is rare in southern Utah during the summer and is usually found in riparian habitats, especially in areas of dense willows associated with rivers and wetlands (Bosworth 2003). The majority of the dense willow stand riparian areas in the decision area are found in narrow canyons that are prone to flash flooding. These conditions limit the ability of the habitat to support nesting birds. The major factor in the decline of the flycatcher is likely the alteration or loss of its essential riparian habitat (UDWR 2005b). In addition, encroachment of exotic plant species, particularly tamarisk and Russian olive, into lowland riparian areas threatens to change the usable nature of the riparian habitats (UDWR 2005a).

Western Yellow-Billed Cuckoo (*Coccyzus americanus occidentalis*) is considered a riparian obligate and is usually found in large (greater than 25 acres) tracts of dense cottonwood or willow habitats (UDWR 2005b). The riparian areas in the decision area may provide habitat for this species. Distribution of the cuckoo is not well understood; the western population segment is limited to disjunct fragments of riparian habitat, and the known distribution within Utah is statewide but very scattered (UDWR 2005a). Population status and trends within the decision area are unknown; however, yellow-billed cuckoos have been documented adjacent to the planning area in Iron, Washington, and San Juan counties since 1983 (Bosworth 2003). Yellow-billed cuckoos are one of the latest migrants to arrive and breed in Utah; they arrive in late May or early June and breed in late June through July (Parrish et al. 2002). Nesting habitat is classified as dense lowland riparian characterized by a dense sub-canopy or shrub layer (regenerating canopy trees, willows, or other riparian shrubs) within 330 feet of water (UDWR 2005b). Yellow-billed cuckoo nesting behavior may be closely tied to food abundance. Primary threats to the species include the loss and fragmentation of riparian corridors to invasive species, improper livestock management, and development (UDWR 2005a, Bosworth 2003).

Utah Prairie Dog (*Cynomys parvidens*) was listed as an endangered species under the ESA, as amended on June 4, 1973. On May 29, 1984, the prairie dog was reclassified as a threatened species (49 *Federal Register* 22330–22334). Historically, the Utah prairie dog was found in southwestern and central Utah, and is endemic to Utah (UDWR 2005a). The habitat of a prairie dog consists of continuous grassland and other vegetation on flat plains. The Utah prairie dog is found at elevations from 5,400 feet on valley floors up to 9,500 feet in mountain mesa habitats. Three Utah prairie dog recovery areas have been established.

One of these areas, the Paunsaugunt Recovery Area, is within the planning area. In 2002, eight Utah prairie dog complexes were reported in this recovery area on combined BLM, state, and private lands (BLM 2005a).

The prairie dog lives both aboveground and underground. The most obvious feature of a prairie dog colony is the abundance of mounds and holes. Utah prairie dog habitat has been recorded in the northwest portion of the decision area (BLM 2003). Major threats to the species include direct habitat loss (through urban or public land development) and outbreak of the bubonic plague (UDWR 2005a). Prairie dogs are susceptible to several diseases that lead to their rapid decline and even to the disappearance of entire colonies.

A recovery plan was completed for the Utah prairie dog in 1991 (USFWS 1991), and a Utah Prairie Dog Interim Conservation Strategy was completed in 1997 (Instruction Memorandum [IM] UT 2002-040). A current management practice for the prairie dog is a translocation program. Translocation of prairie dogs is authorized by the USFWS under the ESA, as amended. It is anticipated that translocations will be a major part of the future management of the Utah prairie dog. No critical habitat has been designated for the Utah prairie dog.

Kanab Ambersnail (*Oxyloma kanabense*) was first collected in 1910 and listed as endangered in 1992. The gastropod has been reported in two localities in Utah, both in the extreme southern portion of Kane County. The larger population, reported to be extant, is located at Three Lakes; a much smaller population, reported as seemingly extirpated, occurred in Kanab Creek Canyon (UDWR 1999a). Although this species occurs within Kane County, there are no known populations located on public lands within the planning area, although potential habitat is present. All known locations are on private land. This species is a wetland snail whose habitat includes wet ledges with rocks and cypridiums associated with spring-fed lakes, marshes, and pools. However, UDWR surveyed potential habitat and found Kanab ambersnail only in areas with standing water and wet substrate (UDWR 2000a). The main threats to this species are habitat loss through development and habitat degradation (dewatering of the habitat through water diversion), direct destruction of the snails through trampling, and developments that alter habitat values (UDWR 1999a, UDWR 2005a).

Coral Pink Sand Dunes Tiger Beetle (*Cicindela limbata albissima*) is a rare insect that occurs only in portions of the Coral Pink Sand Dunes of Kane County in southern Utah. More than 90 percent of the known population is located within Coral Pink Sand Dunes State Park. It is currently a Candidate species for federal listing. The Coral Pink Sand Dunes tiger beetle is a subspecies of the tiger beetle. It has striking coloration; the large, wing cases are predominantly white and much of the body and legs are covered with white hairs (BLM 2001b). The total adult population estimate for 2004 was 757, with a 95 percent confidence range of 600 to 914. The 2004 population estimate was higher than the 2003 estimate of 595, but lower than the 2002 estimate of 2,944 (Knisley and Gowan 2005).

A conservation plan was developed for the Coral Pink Sand Dunes Tiger Beetle in 1997 (Members of the Conservation Committee for the Coral Pink Sand Dunes Tiger Beetle 1997). The conservation plan consists of two parts. The first part focuses on land management within Coral Pink Sand Dunes Tiger Beetle habitat to prevent the need for federal listing under the ESA. The second part is a conservation strategy and agreement that identifies conservation and management objectives. The conservation strategy established conservation areas, directed continued monitoring and research of the tiger beetle, promoted conservation of the dune ecosystem and enhancement of tiger beetle populations, and created a public education program (BLM 2004c).

Autumn Buttercup (*Ranunculus aestivalis*) is a federally listed plant that is endemic to (i.e., it occurs only in) the Sevier River Valley, Garfield County, Utah. The species is found only on private land within

the planning area and there is no known occurrence on BLM-administered lands. A member of the buttercup family, this species is a finely pubescent, upright perennial herb. It is typically 11 to 24 inches tall, and its twice ternately divided leaves are largely in a basal cluster. Autumn buttercup produces abundant yellow flowers that can be seen from late July to early October. It is found in low, herbaceous, wet meadow communities on islands of drier peaty hummocks, and sometimes in open areas, at elevations ranging from 6,360 to 6,450 feet. The habitat has been greatly reduced from that of pre-settlement times by the diversion of water for irrigation and the introduction of domestic grazing animals. There are currently only two small populations of the autumn buttercup known to exist (UDWR 2005b).

Siler Pincushion Cactus (*Pediocactus sileri*) was first listed on October 26, 1979, and is currently designated as threatened. Within the area covered by this listing, this species is known to occur primarily on BLM lands in Arizona and within Kane County and Washington County, Utah. The Kane County population may be the most viable of all the populations currently under study in Utah and Arizona. This cactus is restricted to a specific soil type and has a very restricted range in desert scrub communities. The mean annual number of individuals in the decision area was 122 plants over a 5-year study period (Hreha and Meyer 2000). Threats to this species include disturbance from off-highway vehicle (OHV) use, livestock, insecticide spraying, and possibly mining. In addition, species decline has resulted from private collectors and commercial suppliers (USFWS 1979, Hreha and Meyer 2000).

Welsh's Milkweed (*Asclepias welshii*) is a federally listed threatened plant that occurs in Kane County, Utah. This species is known to occur only in the Coral Pink Sand Dunes and in the Sand Hills 8 miles northeast of the Coral Pink Sand Dunes. This species has been monitored since 1989 (Palmer 1989). Monitoring in 2003 indicated a 15 percent increase in total stem counts from 2002 (Esplin 2003); however, long-term trends are correlated with precipitation (Esplin 2005). The stem counts in the drought years (2000–2003) in some plots were lower than the counts in the previous decade (Esplin 2005). Some plots located within more vegetated dunes have reduced stem counts as well (Esplin 2005). The plants grow on both the tops and sides of the dunes. Critical habitat has been designated and a recovery plan has been developed. Critical habitat includes about 4,000 acres of sand dune habitat in the Coral Pink Sand Dunes and the Sand Hills areas. The 2000 *Vermilion Management Framework Plan* (MFP) amendment addresses further management and protection of this species.

Sensitive Species

This category of species includes those that are on the Utah BLM State Director's Sensitive Species list. For sensitive animal species, this list includes those identified by the BLM and the UDWR. The State of Utah does not maintain an official sensitive plant species list; however, the BLM maintains a state sensitive plant list. These lists are subject to period change; new lists will be incorporated into the land use planning document through plan maintenance or amendments. Table 3-13 lists the sensitive species in the decision area. These species are managed as necessary to protect them and their habitat from loss in accordance with the Federal Land Policy Management Act (FLPMA) and BLM guidelines, and Federal Government directives. It should be noted that these species are known to occur within the planning area, but may or may not occur within the decision area. Following the table are narratives that provide a brief description of each sensitive species and its habitat.

Table 3-13. Sensitive Animal and Plant Species

Common Name	Scientific Name	BLM Status	UDWR Status
Amphibians			
Arizona Toad	<i>Bufo microscaphus</i>	Sensitive	Wildlife species of concern

Common Name	Scientific Name	BLM Status	UDWR Status
Reptiles			
Desert Night Lizard	<i>Xantusia vigilis</i>	Sensitive	Wildlife species of concern
Birds			
Ferruginous Hawk	<i>Buteo regalis</i>	Sensitive	Wildlife species of concern
Greater Sage-Grouse	<i>Centrocercus urophasianus</i>	Sensitive	Wildlife species of concern
Long-Billed Curlew	<i>Numenius americanus</i>	Sensitive	Wildlife species of concern
Burrowing Owl	<i>Athenecunicularia</i>	Sensitive	Wildlife species of concern
Short-Eared Owl	<i>Asio flammeus</i>	Sensitive	Wildlife species of concern
Black Swift	<i>Cypseloides niger</i>	Sensitive	Wildlife species of concern
Lewis' Woodpecker	<i>Melanerpes lewis</i>	Sensitive	Wildlife species of concern
Three-Toed Woodpecker	<i>Picoides tridactylus</i>	Sensitive	Wildlife species of concern
Northern Goshawk	<i>Accipiter gentilis</i>	Sensitive	Conservation agreement species
Grasshopper Sparrow	<i>Ammodramus savannarum</i>	Sensitive	Wildlife species of concern
Mammals			
Fringed Myotis	<i>Myotis thysanodes</i>	Sensitive	Wildlife species of concern
Western Red Bat	<i>Lasiurus blossevillei</i>	Sensitive	Wildlife species of concern
Spotted Bat	<i>Euderma maculatum</i>	Sensitive	Wildlife species of concern
Townsend's Big-Eared Bat	<i>Corynorhinus townsendii</i>	Sensitive	Wildlife species of concern
Allen's Big-Eared Bat	<i>Idionycteris phyllotis</i>	Sensitive	Wildlife species of concern
Big Free-Tailed Bat	<i>Nyctinomops macrotis</i>	Sensitive	Wildlife species of concern
Pygmy Rabbit	<i>Brachylagus idahoensis</i>	Sensitive	Wildlife species of concern
Fish			
Colorado River Cutthroat Trout	<i>Oncorhynchus clarki pleuriticus</i>	Sensitive	Conservation agreement species
Bonneville Cutthroat Trout	<i>Oncorhynchus clarki utah</i>	Sensitive	Conservation agreement species
Leatherside Chub	<i>Gila copei</i>	Sensitive	Wildlife species of concern
Roundtail Chub	<i>Gila robusta</i>	Sensitive	Conservation agreement species
Bluehead Sucker	<i>Catostomus discobolus</i>	Sensitive	Conservation agreement species
Flannelmouth Sucker	<i>Catostomus latipinnis</i>	Sensitive	Conservation agreement species
Plants			
Lori's Columbine	<i>Aquilegia loriae</i>	Sensitive	Not Applicable
Gumbo Milkvetch	<i>Astragalus ampullarius</i>	Sensitive	Not Applicable
Escarpment Milkvetch	<i>Astragalus stratiflorus</i>	Sensitive	Not Applicable
Meager Camissonia	<i>Camissonia exilis</i>	Sensitive	Not Applicable
Hole-in-the-Rock Prairie-Clover	<i>Dalea flavescens epica</i>	Sensitive	Not Applicable
Utah Spurge	<i>Euphorbia nephradenia</i>	Sensitive	Not Applicable
Cataract Gilia	<i>Gilia latifolia imperialis</i>	Sensitive	Not Applicable
Paria Iris	<i>Iris pariensis</i>	Sensitive	Not Applicable
Zion Jamesia	<i>Jamesia americana zionis</i>	Sensitive	Not Applicable

Common Name	Scientific Name	BLM Status	UDWR Status
Claron Pepperplant	<i>Lepidium montanum clarense</i>	Sensitive	Not Applicable
Cutler's Lupine	<i>Lupinus caudatus cutleri</i>	Sensitive	Not Applicable
Chinle Evening Primrose	<i>Oenothera murdockii</i>	Sensitive	Not Applicable
Kane Breadroot	<i>Pediomelum epipsilum</i>	Sensitive	Not Applicable
Sandloving Penstemon	<i>Penstemon ammophilus</i>	Sensitive	Not Applicable
Cronquist Phacelia	<i>Phacelia cronquistiana</i>	Sensitive	Not Applicable
Atwood's Pretty Phacelia	<i>Phacelia pulchella atwoodii</i>	Sensitive	Not Applicable
Chinle Chia	<i>Salvia columbariae argillacea</i>	Sensitive	Not Applicable
Kanab Thelypody	<i>Thelypodopsis ambigua erecta</i>	Sensitive	Not Applicable
Tropic Goldeneye	<i>Viguiera soliceps</i>	Sensitive	Not Applicable
Pinnate Spring Parsley	<i>Cymopterus beckii</i>	Sensitive	Not Applicable
Alcove Bog-Orchid	<i>Habenaria zothecina</i>	Sensitive	Not Applicable

Note: These species may occur within the overall area of Kane and Garfield counties; however, they may or may not be present within the decision area.

Sources: UDWR 2006a; BLM IM-UT-2003-027 (BLM Sensitive Plant Species List for Utah, August 2002)

Amphibians

Arizona Toad (*Bufo microscaphus*) is present in Kane County, although the species is concentrated in the Virgin River basin in Washington County (UDWR 2005a). This species inhabits streams, washes, irrigated crop lands, reservoirs, and uplands adjacent to water. The Arizona toad lays eggs on the bottoms of shallow, slow-moving streams. The diet of adults consists mainly of insects and snails, whereas larvae (tadpoles) consume plant matter and organic debris (UDWR 2005c). Threats to this species include reduction of native vegetation and reduction in the extent of riparian corridors (UDWR 2005a)

Reptiles

Desert Night Lizard (*Xantusia vigilis*) is present within Garfield County. The desert night lizard is found in arid and semiarid rocky areas. Habitat consists of concealing, protective vegetation, such as yuccas and agaves, as well as rock crevices and dead brush. The desert night lizard eats a variety of insects and other small invertebrates (UDWR 2005c). Threats to this species include human disturbance (recreation) and development in available habitat (UDWR 2005a).

Birds

Ferruginous Hawk (*Buteo regalis*) is distributed throughout most of Utah, although it is rare and productivity may not be sufficient to maintain the state's population (UDWR 2005a). Productivity in ferruginous hawks is directly correlated with the available prey base such as jackrabbits. Due to the cyclic nature of jackrabbit populations, ferruginous hawks may experience similar population booms and crashes. Breeding ferruginous hawks rely on grassland or shrub-steppe terrain and, in many parts of Utah, nest on the ecotone between these habitats and pinyon-juniper woodlands (UDWR 2005c). "The species is prone to abandon nest sites with...low levels of human disturbance" (UDWR 2005a, pp 6-25). Threats include human disturbance (recreation and mineral development) and loss of preferred pinyon-juniper woodland habitats (UDWR 2005a).

Greater Sage-Grouse (*Centrocercus urophasianus*) brooding and winter habitat is present in both Garfield and Kane counties (Map 3-9), and populations are documented in both counties (UDWR 2002), both brooding and winter populations. Greater sage-grouse inhabit sagebrush plains, foothills, and

mountain valleys. The Greater sage-grouse is an herbivore and insectivore, and is associated with both tall and short sagebrush types. Sagebrush, understory of grasses and forbs, and associated wet meadow areas are essential for optimum habitat.

Sage-grouse use the same breeding ground or leks for several consecutive breeding seasons (UDWR 2005c). The planning area contains habitat and leks for the southern-most population of Greater sage-grouse. There are two known leks in the decision area (one active and one historic) and seven known leks on adjacent lands within the planning area (three active, one inactive, and one historic). Habitat within the planning area could contain additional leks. UDWR monitoring indicates fairly level trends for sage-grouse cock use of leks on three of the active leks. On the fourth active lek, UDWR monitoring data indicate that use is declining using an 8-year trend, but that a 3-year trend indicates an increase in use. On the inactive lek in the planning area no sage-grouse cocks have been counted in 10 years, and there is concern that the population may be extirpated. No sage-grouse cocks have used the historic lek on the decision area in recent years, but grouse have been observed in the area.

The USFWS began a formal status review after receiving three petitions to list the Greater sage-grouse range-wide as endangered or threatened (USFWS 2005). The USFWS publicly recommended on December 3, 2004, that the sage-grouse did not at that time warrant listing under the ESA. One of the greatest threats to the sage-grouse is the direct loss of the sagebrush steppe environment due to pinyon-juniper encroachment, mineral development, and invasive plants (UDWR 2005a). The BLM is analyzing a proposal to surface mine coal in the Alton area. The southern-most lek of the sage-grouse, located adjacent to public lands in this area, could be affected by development of the mine. Changes in function of the sagebrush steppe, including disrupted fire regimes and the lack of herbaceous understory, reduce the usable values of the existing habitat (UDWR 2005a).

Long-Billed Curlew (*Numenius Americanus*) are present within both Garfield and Kane counties. The Great Basin comprises a significant portion of their overall range and has been described as an area of great importance in maintaining breeding populations of long-billed curlews. Food sources are diverse, including crustaceans, mollusks, worms, toads, adult and larvae of insects, and sometimes berries. Long-billed curlews nest on the ground in dry grasslands where sufficient cover and abundant prey exist (UDWR 2005c). Threats associated with public land management include fragmentation of nesting habitat and human disturbance (UDWR 2005a).

Burrowing Owl (*Athene cunicularia*) prefer open areas within deserts, grasslands, and sagebrush steppe communities. Both primary and secondary breeding habitat exists in Garfield and Kane counties. Habitat consists of well-drained, level to gently sloping areas characterized by sparse vegetation and bare ground, such as moderately or heavily grazed pasture. Burrowing owls breed in pastures, hayfields, fallow fields, road and railroad rights-of-way (ROW), and in a number of urban habitats. They eat mainly terrestrial invertebrates, but also consume a variety of small vertebrates, including small mammals, birds, frogs, toads, lizards, and snakes (UDWR 2005c). Threats include fragmentation and loss of nesting habitat (UDWR 2005a).

Short-Eared Owl (*Asio flammeus*) are present in both Garfield and Kane counties. In Utah, short-eared owls are distributed over most of the state; however, today they are less widespread than they were historically. The short-eared owl is an open-country, ground-nesting species that occupies grasslands. Populations of short-eared owls are largely dependent on the abundance of small mammals (e.g., voles) for prey (UDWR 2005c). Threats include reducing suitable habitat for nesting and prey, as well as loss and abandonment of nests from human disturbances (UDWR 2005a).

Black Swift (*Cypseloides niger*) habitat is present in Kane and Garfield counties, specifically in and around Zion National Park (UDWR 2005a). No known confirmed breeding locations are within Kane or

Garfield counties. Black swifts require waterfalls for nesting. Typically the falls are permanent, but they may be intermittent if they flow throughout the breeding season. Black swifts are colonial nesters and may nest in groups of less than 10 pairs near and often behind waterfalls at elevations from 6,000 to 11,500 feet. Foraging flocks, often associated with swallows or other swifts, may occur several miles from the nest site. Black swifts are aerial insectivores and feed exclusively on aerial insects (Parrish et al. 2002). Human disturbances such as hiking to and around waterfalls may impact nesting (UDWR 2005a).

Lewis's Woodpecker (*Melanerpes lewis*) is present in both Kane and Garfield counties. Lewis's woodpecker is a habitat specialist, with primary breeding habitat in ponderosa pine and open riparian areas. Winter habitat includes open woodlands and lowland riparian areas. Lewis's woodpecker is a cavity nester that nests in dead or dying trees, often using previously excavated holes. The diet of the Lewis's woodpecker is composed primarily of insect prey during the breeding season and nuts and berries during the fall and winter (UDWR 2005c). Threats include changes in habitat condition such as decreasing open forests needed for foraging and groundcover that is required by insect prey in riparian areas (UDWR 2005a).

Three-Toed Woodpecker (*Picoides tridactylus*) is a permanent resident of coniferous forests above 8,000 feet and is dependent on live and dead trees for foraging and nesting (UDWR 2005a). The species is fairly easily observed in the Uinta Mountains and in areas of Cedar Breaks National Monument. This species may be very common in areas associated with spruce bark beetle infestations and may nest in loose colonies; they play an important role in controlling such insect outbreaks (UDWR 2005c). Threats include loss of habitat from removal of dead trees (removing snags or salvage logging) as well as fire suppression that reduces the presence of fire-killed trees (UDWR 2005a).

Northern Goshawk (*Accipiter gentilis*) is present within both Kane and Garfield counties. The northern goshawk prefers mature mountain forest (conifer and aspen) and riparian zone habitats. Nests are constructed in trees in mature forests; often nests previously used by northern goshawks or other bird species are re-used. Northern goshawks cruise low through forest trees to hunt, and may also perch and watch for prey. Major prey items include rabbits, hares, squirrels, and birds (UDWR 2005b). Threats include changes in connectivity among suitable habitat stands and the loss of large-diameter trees to fire, insects, or harvest (UDWR 2005a).

Grasshopper Sparrow (*Ammodramus savannarum*) is limited primarily to the northernmost region of Utah in conjunction with native grassland and fields enrolled in the Conservation Reserve Program. However, potential breeding habitat for the species does exist in Kane and Garfield counties. The grasshopper sparrow is dependent on dry grassland, a habitat that is increasingly threatened by human development and conversion to cropland (UDWR 2005c). The species appears to nest only in ungrazed grasslands (UDWR 2005a).

Mammals

Fringed Myotis (*Myotis thysanodes*) occurs in Kane and Garfield counties. Fringed myotis roost in tightly packed clusters, using caves, mine tunnels, and buildings for day and night roosts. They are sensitive to human disturbances, especially when in maternity colonies. Important habitat areas for this species are lowland riparian areas and water courses (UDWR 2005c). Threats include the loss of riparian zones (UDWR 2005a).

Western Red Bat (*Lasiurus blossevillii*) is very rare in Utah and is sparsely distributed within north-central, central, and southwestern regions of the state. Western red bats roost in the foliage of cottonwood trees and are dependent on broad-leaf shrubs and trees in lowland riparian zones below 5,700 feet elevation. Loss of riparian habitat is the main threat to Western red bat (UDWR 2005c). In addition, the

species is sensitive to human disturbance to caves and mines, although these are not the primary roost sites (UDWR 2005a).

Spotted Bat (*Euderma maculatum*) is considered rare in Utah. Spotted bats can occupy many habitats but are most frequently found in dry, rough, desert terrain with roosts in rock crevices and under loose rocks or boulders (UDWR 2005c). Threats include decreases in prey base due to use of pesticides to control Mormon crickets, as well as local disturbances due to recreational rock climbing (UDWR 2005a).

Townsend's Big-Eared Bat (*Plecotus townsendii*) occurs throughout Utah in caves, abandoned mines, and occasional buildings. They are generally limited to elevations below 9,000 feet and often occur in scrub communities and pinyon-juniper woodlands (UDWR 2005a). Threats to Townsend's big-eared bat are mainly loss of habitat through human disturbance, especially maternity colonies, and mine closures (UDWR 2005c, UDWR 2005a).

Allen's Big-Eared Bat (*Idionycteris phyllotis*) are known to occur in Kane and Garfield counties (UDWR 2005a). Allen's big-eared bats occur in riparian woodlands of cottonwood and willow to forested mountain areas of pine and oak. The species is also found in pinyon-juniper woodland habitat or salt-cedar. Maternity colonies are generally located in mine tunnels and boulder piles, and are susceptible to human disturbance (UDWR 2005c, UDWR 2005a).

Big Free-Tailed Bat (*Nyctinomops macrotis*) is relatively rare in Utah, and its distribution is considered highly fragmented. Big free-tailed bats inhabit rugged, rocky terrain; roost in rock crevices and occasionally in caves, buildings, and tree holes; and forage in sagebrush flats. The wing morphology of big free-tailed bat necessitates a vertical drop for it to achieve flight, which requires very specific location sites for roosts (UDWR 2005c). Threats include pesticide use in foraging areas (UDWR 2005a).

Pygmy Rabbit (*Brachylagus idahoensis*) occurs in isolated patches in the western half of Utah. The species requires deep soils for burrowing, and tall, dense sagebrush for cover and food. Threats to pygmy rabbit include loss and/or deterioration of the sagebrush steppe habitat from encroachment by pinyon-juniper woodlands, changes in fire frequency due to fire suppression or introduction of perennial grasses, and developments fragmenting the habitat (UDWR 2005c, UDWR 2005a).

Fish

Colorado River Cutthroat Trout (*Oncorhynchus clarki pleuriticus*) is a state conservation species. The decision area contains approximately 5 miles of historic habitat. Threats to the species include loss and fragmentation of stream and riparian habitats, hybridization, and disease (UDWR 2005a). However, no current habitat or populations exist within the decision area; therefore, this species is not discussed further.

Bonneville Cutthroat Trout (*Oncorhynchus clarki utah*) occurs in approximately 3 miles of one stream within the decision area (in western Garfield County), although historically they occupied approximately 19 miles of stream. Bonneville cutthroat trout can be found in a number of habitat types, from high mountain streams and lakes to low-elevation grassland streams, all with a healthy riparian zone providing structure, cover, shade, and bank stability. Bonneville cutthroat trout consumes primarily insects and, in the case of larger individuals, small fish. Threats include loss or fragmentation of streams and riparian habitat, hybridization, and disease (UDWR 2005c, UDWR 2005a).

Leatherside Chub (*Gila copei*) is endemic to the Bonneville Basin drainage. The species occurs in Utah Lake and Sevier River drainages, with introduced populations in the Colorado River Basin. Leatherside chub occur in pools and low-velocity runs of creeks and small- to medium-sized rivers. Substrate requirements are coarse fines with lower percentages of sand-silt and gravel. Leatherside chub can live up

to 5 years, can grow to 6 inches, and spawn in the summer. Threats to this species include loss of habitat diversity from erosion, channelization, riparian vegetation loss, predation from nonnative fish, and stream dewatering (UDWR 2005c, UDWR 2005a).

Roundtail Chub (*Gila robusta*) habitat is found in tributaries of the Escalante River in the planning area. They spawn in the spring and summer, depending on water temperature (UDWR 2005a). Roundtail chub require rocky runs, rapids, and pools in creeks, small to large rivers, and large reservoirs in the Colorado River system. Roundtail chub eat aquatic and terrestrial insects, snails, crustaceans, fish, and sometimes algae (UDWR 2006b). Threats to roundtail chub in the planning area include dewatering of habitat, pollution, disease, habitat fragmentation, and competition from nonnative fish (NatureServe 2005, UDWR 2005a, UDWR 2006b).

Bluehead Sucker (*Catostomus discobolus*) were documented in the Escalante River in the planning area and are still considered common in portions of this stream, although population declines have been observed in many Escalante River tributaries (UDWR 2006b). The species are omnivores, feeding on algae, plant debris, and occasionally invertebrates (UDWR 2006b). Bluehead sucker inhabit large rivers and mountain streams with variable turbidity and temperature (NatureServe 2005). Threats in this portion of the species' habitat include dewatering streams and subsequent habitat fragmentation (UDWR 2006b, UDWR 2005a).

Flannelmouth Sucker (*Catostomus latipinnis*) are present in the Escalante, Paria, and Virgin River areas in the planning area, although the current status in the Paria River is unknown (UDWR 2006b). The status throughout the Virgin River system is variable, but is protected by actions implemented by the Virgin River Recovery Implementation Program, including management of diversions to benefit native species. Flannelmouth sucker is a bottom feeder, consuming algae, other fragmented vegetation, seeds, and invertebrates (UDWR 2006b). The species lives within moderate to large rivers. Threats are limited in many of these drainages, but include habitat alteration and fragmentation due to development and dewatering, as well as hybridization and competition from nonnative species (NatureServe 2005, UDWR 2006b, UDWR 2005a).

Plants

Lori's Columbine (*Aquilegia loriae*) is in the buttercup family and is endemic to Kane County; however there are no known plants within the planning area. The only known locations are within GSENM. The species can be found in moist canyon walls, wash bottoms, and sand seeps in the Straight Cliffs, Moenave, Navajo, and possibly the Kaiparowits sandstone formations near ponderosa pine and oak communities (Utah Native Plant Society 2005).

Gumbo Milkvetch (*Astragalus ampullarius*) is located within Arizona and within Kane and Washington counties, Utah. Habitat for this plant species is mixed desert scrub and juniper communities with clay soils (Utah Native Plant Society 2005).

Escarpment Milkvetch (*Astragalus stratiflorus*) is endemic to Arizona and Kane and Washington counties, Utah. Habitat for this plant species includes interdune valleys, sandy depressions on ledges and terraces in stream channels, pinyon-juniper, ponderosa pine, and sandy desert scrub communities ranging in elevation from 4,900 to 6,600 feet (Utah Native Plant Society 2005).

Meager Camissonia (*Camissonia exilis*) is endemic to western Kane County. Habitat for this plant species includes sagebrush, galleta, and pinyon-juniper communities from 5,000 to 6,900 feet in elevation (Utah Native Plant Society 2005).

Hole-in-the Rock Prairie-Clover (*Dalea flavescens epica*) is limited to a few counties within Utah, and is present in both Kane and Garfield counties. Habitat for the species is sandstone bedrock, sandy areas in blackbrush, and mixed desert scrub at elevations of 4,700 to 5,000 feet (Utah Native Plant Society 2005).

Utah Spurge (*Euphorbia nephradenia*) is endemic to Utah and is present in both Kane and Garfield counties. There are no known plants within the decision area, although there is habitat. Habitat for this species includes mat-saltbush, blackbrush, ephedra, and mixed sandy desert scrub communities, mainly in the Tropic Shale and Entrada formations. The species can be found at elevations of 3,800 to 4,800 feet (Utah Native Plant Society 2005).

Cataract Gilia (*Gilia latifolia imperialis*) is endemic to Utah and is present in Kane and Garfield counties. There are no known plants within the decision area, although there is habitat. Habitat for the species is shadscale and other mixed desert scrub communities. Cataract gilia is found at elevations of 3,800 to 5,200 feet (Utah Native Plant Society 2005).

Paria Iris (*Iris pariensis*) can be found in Kane County, Utah; however, the species has not been located anywhere for several years. Habitat for this species is grass-shrub communities at elevations of 4,600 feet (Utah Native Plant Society 2005).

Zion Jamesia (*Jamesia americana zionis*) is endemic to Zion Canyon and may be found in Kane County, Utah. Habitat for the species is pinyon-juniper, oak and ponderosa pine communities, hanging gardens, sandstone crevices, and cliff sides. The species can be found at elevations of 4,200 to 6,000 feet (Utah Native Plant Society 2005).

Claron Pepperplant (*Lepidium montanum claroense*) is endemic to the Paunsaugunt and Table Cliff Plateaus of Utah. The species can be found in Kane and Garfield counties. Habitat for the species is limited to sagebrush, pinyon-juniper, ponderosa pine, and bristlecone pine communities. The species is usually found on fine-textured substrates such as the Wasatch Limestone formation and at elevations of 6,400 to 8,000 feet (Utah Native Plant Society 2005).

Cutler's Lupine (*Lupinus caudatus cutleri*) is endemic to Utah and can be found along the Cockscomb within Kane County. There are no known plants within the decision area, although there is habitat. Habitat for this species is limited to pinyon-juniper communities at 5,150 feet in elevation (Utah Native Plant Society 2005).

Chinle Evening Primrose (*Oenothera murdockii*) is endemic to Utah and can be found within Kane County. There are no known plants in the decision area, although there is habitat. There are known locations within the GSENM. Habitat for this species is limited to pinyon-juniper communities on red-purple or gray clay silty barrens of the Chinle Formation, and possibly the adjacent Moenkopi Formation. The species can be found at elevations of 4,400 to 5,600 feet (Utah Native Plant Society 2005).

Kane Breadroot (*Pediomelum epipsilum*) is endemic to the Colorado Plateau in Kane County, Utah. Habitat for this species is pinyon-juniper woodland and desert scrub communities on the Chinle and Moenkopi formations at elevations of 4,000 to 5,500 feet (Utah Native Plant Society 2005).

Sandloving Penstemon (*Penstemon ammophilus*) is endemic to both Kane and Garfield counties of Utah. Habitat for this species is wind-blown sand deposits derived from Navajo sandstone, and ponderosa pine and mixed shrub communities at 5,900 to 7,200 feet in elevation (Utah Native Plant Society 2005).

Cronquist Phacelia (*Phacelia cronquistiana*) is endemic to western Kane County, Utah. There are no known plants in the decision area, although there is habitat. There are known locations within the

GSENM. Habitat for the species is limited to clay outcrops in sagebrush, ponderosa pine and, pinyon-juniper communities. The species can be found at elevations of 6,300 to 6,900 feet (Utah Native Plant Society 2005).

Atwood's Pretty Phacelia (*Phacelia pulchella atwoodii*) is endemic to western Kane County, Utah. There are no known plants found within the decision area, although there is habitat. The species occurs in pinyon-juniper, oak, sagebrush, and serviceberry communities on soils derived from the Moenkopi and Carmel Formations. The species is limited to elevations of 5,100 to 5,500 feet (Utah Native Plant Society 2005).

Chinle chia (*Salvia columbariae argillacea*) is endemic to western Kane County, Utah. There are no known plants found within the decision area, although habitat is present. The species is limited to sparsely vegetated pinyon-juniper communities on fine-textured saline clay soils and “gypsum boils” on the Chinle formation. The species can be found on alluvium or on colluvium slopes at elevations of 4,250 to 5,600 feet (Utah Native Plant Society 2005).

Kanab Thelypody (*Thelypodopsis ambigua erecta*) is endemic to Kane County, Utah. The species is limited to pinyon-juniper and desert scrub communities on clay soils derived from purple Chinle shales. The plant can be found at elevations of 5,000 to 5,400 feet (Utah Native Plant Society 2005).

Tropic Goldeneye (*Viguiera soliceps*) is endemic to Kane County, Utah. There are no known plants within the decision area, although there is habitat. The species is limited to mat saltbush communities on clay knolls and bluffs on Tropic Shale and Chinle formations. The species is limited to elevations of 4,600 to 4,800 feet (Utah Native Plant Society 2005).

Pinnate Spring Parsley (*Cymopterus beckii*) is endemic to San Juan and Wayne counties. However, the Utah BLM State Director's Sensitive Plant Species List also notes that it is present in Garfield County. There are no known plants within the decision area, although there is habitat. The species is limited to sandy or stony places, pinyon-juniper–mountain brush, ponderosa pine–manzanita, conifer-oak, and Douglas fir communities. The species is limited to elevations of 5,575 to 7,050 feet (Utah Native Plant Society 2005).

Alcove Bog-Orchid (*Habenaria zothecina*) is listed on the Utah BLM State Director's Sensitive Plant Species list for Garfield County. There are no known plants within the decision area, although there is habitat. The species is limited to moist streambanks, seeps, and hanging gardens in mixed desert scrub, pinyon-juniper, and oakbrush communities. The species is limited to elevations of 4,000 to 6,200 feet (Utah Native Plant Society 2005).

3.2.7 Fish and Wildlife

The BLM works closely with the UDWR to manage habitat for fish and wildlife (including big game, upland game, waterfowl, neotropical migratory birds, small mammals, amphibians, and reptiles) to achieve and maintain suitable habitat for desired population levels and distribution within the decision area. The UDWR is responsible for managing wildlife population levels; the BLM is responsible for managing wildlife and fisheries habitat in a condition that will support desired levels of species. The BLM works cooperatively with the UDWR to maintain and reestablish populations of native species that have used the historic range located within the Kanab RMP boundary through habitat management and restoration.

Fish and wildlife habitat is generally managed according to the guiding principles outlined by the BLM *Wildlife 2000, The Riparian-Wetlands Initiative for the 1990s, A Strategy for Future Waterfowl Habitat*

Management on Public Lands, Watchable Wildlife, and Recreational Fisheries Program and other species- and habitat-specific direction such as the *National Sage-Grouse Habitat Conservation Strategy* (BLM 2004a). The BLM implements this general guidance through specific management actions associated with species in the project area.

Wildlife Habitat Types

Wildlife habitat needs vary significantly by species. Wildlife habitat can occur as continuous or disjunctive features and extend from low elevations to high elevations. Climate, precipitation, soils, and biota respond to varying elevations, slope, and aspect. Big game populations are managed based on habitat condition and the quality of the animals being produced. Population levels are linked to a variety of factors, including vegetation quality and quantity; adequate space, shelter, and cover; water distribution; and regional weather patterns and trends such as prolonged drought. As water availability and distribution affects wildlife populations, water developments, whether constructed primarily for livestock or wildlife, can improve water availability in wildlife habitat.

Desert Scrub

Desert scrub includes numerous upland vegetation communities with a shrubland component and a variable understory of grass and forbs. Herbaceous plants are vital to the majority of all wildlife species by providing food, cover, and structure. The thermal relief provided by scrub cover helps wildlife survive the rigors of summer heat and winter cold. It supplies browse, seeds, and cover for birds and small and large mammals. Intermingled areas of desert grasslands add diversity to vegetation and habitat structure in desert scrub communities.

Sagebrush Steppe

Sagebrush habitat is prevalent in the western and central portions of the decision area. At mid to lower elevations, big sagebrush is the dominant habitat type, providing important winter habitat for certain wildlife species (e.g., mule deer, pronghorn, and Greater sage-grouse) and localized yearlong habitat for sagebrush-obligate species (e.g., pygmy rabbit). Sagebrush also provides crucially important breeding, nesting, and brood-rearing habitat for these species. Intermingled occurrences of grasslands and several low sages add to the diversity of vegetation and habitat structure. Diversity of sagebrush age class is also important for wildlife. A mosaic of sagebrush age classes is preferable to a stand of sagebrush with the same age class for wildlife. Because sagebrush is a relatively short-lived species, in the absence of disturbance there is no recruitment of younger individuals; consequently, the stand has the tendency to become old and decadent, decreasing its habitat value for wildlife. As a result of the regional losses of sagebrush communities, and the number of sagebrush-obligate wildlife, maintenance and improvement of existing sagebrush habitat has become crucial for community structure and diversity and for providing crucial habitat for sagebrush-obligate species.

Pinyon-Juniper Woodlands

Pinyon-juniper woodlands are widely dispersed throughout the decision area and have expanded into sagebrush steppe and other vegetation communities (Section 3.2.5 [Vegetation]). Pinyon-juniper woodlands provide some wildlife habitat. Although understory vegetation is reduced beneath pinyon-juniper stands, they provide greater structural diversity than desert scrub or sagebrush steppe habitats.

Mixed Conifer

Mixed conifer habitats in the field office area are located in upper elevations and mesic areas. These habitats contain security areas (i.e., hiding cover) for big game species and can provide important linkage corridors for wildlife movement between other seasonal habitats.

Riparian/Wetland

Riparian/wetland habitats are crucial components in the landscape because they provide various lifecycle requirements such as foraging, bird nesting and roosting, hiding cover, as well as travel corridors for numerous species. The riparian vegetation is often a corridor for animal migration and travel. A high degree of plant diversity typically occurs along the riparian corridors, exhibiting a variable density and composition of plants that leads to diversity of openness and groundcover. Invasive species such as tamarisk and Russian olive are a management concern because of their prolific seed production and high evapotranspiration rates. Tamarisk can quickly overtake a riparian area on introduction into that area because they produce a tremendous amount of seeds. These species then reduce the amount of available surface water and affect the health of riparian systems.

Riparian vegetation moderates water temperatures and provides bank structures that limit erosion and provide overhead vegetation cover for fish. Intact riparian communities also slow overland flow, capture sediments, and provide a filter that enhances water quality. Water quality, especially in regard to such factors as sediment, temperature, and dissolved oxygen, also greatly affect fisheries habitat.

Aspen

Multi-seral stages of aspen and associated understory provide multiple benefits to many wildlife species. Many raptor species are adapted to aspen forest and the adjacent open brush, meadows, and grasslands that provide a vast array of prey species. The aspen ecosystem is considered of crucial importance to economically important big game species (e.g., elk and deer). Aspen ecosystems provide cover, calving, and fawning habitat for big game, and nesting habitat for migratory birds. Aspen also provides suitable vegetation for breeding and feeding areas.

Non-Vegetated (Cliff Talus)

Talus slopes are steep slopes of exposed chunks of rock that offer both basking sites and crevices for hiding. Slopes with large boulders provide caves that may be large enough for a species such as a bobcat to occupy. Cliffs are faces of vertical exposed rock that sometimes have a talus slope at their base. Several raptor species and birds such as black swifts use cliff and talus areas for nesting and brood-rearing habitat. Peregrine falcons and golden eagles generally nest on rock outcrops and cliffs that range from 30 to 400 feet high. Canyon and rock wrens nest in the fractured talus slope below cliff faces, particularly in areas that are interspersed with open, patchy forests of ponderosa pine, Douglas fir, and sagebrush steppe communities.

Agriculture/Developed

Agricultural land within the planning area is an aggregation of areas with grasses, legumes, or grass-legume mixtures planted for livestock grazing or the production of seed or hay crops. These areas provide important forage for big game and some migratory bird species as well as cover for smaller game species.

Ponderosa Pine

Ponderosa pine forests provide habitats for various wildlife species. Snags in the mature pine forest provide a large number of species with nesting and roosting sites. Big game, such as deer and elk, also use the pine forests for food and shelter (Howard 2003).

Oak/Mountain Shrub

There are two types of mountain shrub communities within the planning area—mountain big sagebrush and mixed mountain shrub. These areas provide food and cover for mule deer, elk, blue grouse, black bear, and black-headed grosbeak.

Wildlife

The decision area contains a variety of habitats that have the biological and physical attributes that are important in the life cycles of many wildlife species. General habitat characterizations reflect vegetation resource condition, habitat quality relative to fragmentation or density of intrusion, and level of conflicts with competing resource issues or as indicated by population level. Ranking of relative habitat values to populations of individual species is as follows:

- Crucial—Area that provides for “sensitive” biological and/or behavioral requisites necessary to sustain the existence of wildlife populations
- High-Priority—Area that provides for “intensive” use
- Substantial—Area that provides for “frequent” use
- Limited—Area that provides for only “occasional” use.

There can be crucial time periods in an animal’s life cycle during which protection from man’s disturbance is essential to the population’s survival. During those times, the species’ use area would be ranked as being of crucial value.

Through cooperative transplants, introduction of elk, pronghorn, bighorn sheep, chukar, and turkey have historically occurred on lands within or adjacent to the decision area. The UDWR formally coordinates these activities with the BLM and other public and private entities on a case-by-case basis. Certain management activities may be augmented with cooperative efforts with non-profit conservation groups.

Mule Deer

Mule deer are present in portions of seven UDWR wildlife management units within the planning area. Crucial and high-value mule deer habitat is located in the western portions of Kane County and throughout Garfield County, largely coinciding with the western portions of the decision area (Map 3-10). Mule deer are migratory, moving seasonally between summer and winter ranges. Mule deer usually summer at high elevations and winter at low elevations. Loss and degradation of lower elevation winter range can limit mule deer populations (UDWR 2005a). Loss of winter range is a limiting factor on the western portions of the decision area (UDWR 2005d, UDWR 2005e). Throughout the remainder of the decision area, habitat decline is threatening the health of the mule deer herds (UDWR 2005f, UDWR 2006c, UDWR 2005g, UDWR 2005h). The cause of habitat decline is generally associated with decadent sagebrush steppe and encroaching pinyon-juniper communities.

Mule deer feed on forbs, grasses, and shrubs throughout the spring and summer months and primarily on shrubs during the fall and winter. Shrubs such as Wyoming big sagebrush, true mountain mahogany, fourwing saltbush, and antelope bitterbrush are important winter forage species. Mule deer fawn during

the spring during their migration from the winter to the summer range. Mule deer populations throughout the decision area are approximately 80 percent of UDWR objectives; current population trends reflect an increase in herd numbers over the past 4 years.

Mule deer have a high degree of fidelity to specific winter ranges where high population densities concentrate on relatively small areas. Because of the relatively small winter range area, high population densities, and the natural stress of winter survival, mule deer are vulnerable to stress caused by human activity in winter range areas. Mule deer are displaced an average of 600 feet from areas of human activity (Hiatt and Baker 1981).

Elk

Crucial elk habitat exists in the eastern portions of the planning area in Garfield County. High-value elk habitat exists in the western portions of the planning area in both Kane and Garfield counties (Map 3-11). Elk are migratory, moving seasonally between summer and winter ranges. They summer at higher elevation ranges in aspen and conifers where their diet consists primarily of grasses and forbs. Elk calve during late spring and early summer in aspen-mountain browse intermixed vegetation types. Elk winter at mid to lower elevation ranges occupying the sagebrush and pinyon-juniper vegetation types where they congregate in herds of 50 to 200 or more. Human activity in elk winter range or transitional ranges adds stress to the natural stress of winter survival. Elk populations above the town of Escalante and in the southeast portion of the decision area are approximately 33 percent of UDWR objectives. Throughout the remainder of the decision area current populations slightly exceed UDWR objectives; current population trends reflect an increase in herd numbers over the past 4 years, except in the southeast portions of the decision area (Boulder area) where there was a nearly 75 percent decrease in the elk population between 2004 and 2005, due to issues not related to BLM-managed habitat.

Pronghorn

Pronghorn are present in portions of three UDWR wildlife management units within the planning area. Crucial and high-value pronghorn habitat is located in many areas within Garfield County within the planning area, and within the eastern and southeastern portions of Kane County within the planning area (Map 3-12). Most of the habitat within Kane County is located within the UDWR Kaiparowits wildlife management unit, with habitat identified in the GSENM, the Glen Canyon National Recreation Area, and on Utah State Trust lands, although a small amount of high-value habitat extends within the Paria Canyon–Vermilion Cliffs Wilderness Area. A population of approximately 150 pronghorn occurs within this unit, reintroduced into the East Clark Bench area of GSENM over the past 5 years (UDWR 2006d). This is the only portion of the UDWR unit with an pronghorn population (UDWR 2006d).

The largest areas of identified pronghorn habitat within or adjacent to the decision area are within the Panguitch Valley and John's Valley. There are approximately 600 pronghorn in these two areas (UDWR 2006e). Overall, the trend for these populations is increasing, although the increases appear to be occurring in the John's Valley area, with population decreases occurring in the Panguitch Valley "due to several years of drought" (UDWR 2006e). Two supplemental transplants (25 animals in both 2004 and 2005) have boosted the Panguitch Valley population (UDWR 2006e).

Pronghorn prefer open vegetative types, such as salt desert scrub, grassland, sagebrush steppe, and other treeless areas. Typically, pronghorn avoid slopes greater than 20 percent (Ockenfels et al. 1994). Pronghorn fawning occurs throughout the range of this species. Pronghorn diets consist of a variety of forbs, shrubs, and grasses. Forbs are of particular importance during spring and summer, whereas shrubs are more important during the winter.

Desert Bighorn Sheep

Both crucial and high-value habitat for Desert bighorn sheep is located along the eastern border of Garfield County and throughout Kane County, most of which is not in the decision area. However, there is a small amount of crucial Desert bighorn sheep habitat on the western edge of Kane County in the decision area. Desert bighorn sheep, which are considered yearlong residents of their range, do not have seasonal ranges as do mule deer and elk (Map 3-13). Bighorn sheep prefer open vegetation types such as low shrub, grassland, and other treeless areas typically associated with steep talus and rubble slopes. Bighorn diets consist of a variety of shrubs, forbs, and grasses. Bighorn sheep lambing occurs on steep talus slopes, typically within 1 to 2 miles of reliable water sources.

Historically, Desert bighorn sheep occupied canyons and ranges in southern and eastern Utah. It is estimated that there were as many as 2 million bighorn sheep in North America at the beginning of the 19th century, but today there are only about 70,000. This decline is thought to have taken place between 1850 and 1900, and was caused by diseases introduced by domestic sheep, loss of habitat to livestock, and excessive hunting by humans. Since 1960 bighorn sheep have increased in number; however, their population levels are still lower than estimates of pre-European numbers.

Bighorn sheep are extremely vulnerable to a variety of viral and bacterial diseases carried by livestock, principally domestic sheep. In some reported cases, bighorn sheep exposure to these diseases has resulted in the decimation of entire populations. These diseases are transmitted in numerous ways, including nose-to-nose contact and wet soils associated with areas of concentrated use such as stock watering ponds. Management of bighorn sheep is guided by the following BLM documents: *Utah BLM Statewide Desert Bighorn Sheep Management Plan* (BLM 1986), *Revised Guidelines for Domestic Sheep and Goat Management in Native Wild Sheep Habitats* (BLM 1998), *Utah Bighorn Sheep Statewide Management Plan* (UDWR 1999b), and corresponding UDWR herd management plans.

Black Bear

Black bear is currently the only species of bear inhabiting Utah. Black bears are native to and fairly common in Utah. High-value, substantial-value, and a smaller amount of crucial-value black bear habitat is located within the planning area. Black bears in Garfield and Kane counties are primarily in large forested areas. As a result of an increase in bear hunting, a statewide limited-entry permit system was implemented in 1990 that requires hunters to obtain permits and hunt within a specific unit (UDWR 2000b).

Cougar

Cougar, or mountain lions, are found statewide in Utah, occupying habitat types ranging from rugged desert areas to above timberline. Crucial habitat is found throughout Garfield and Kane counties. The species is fairly common throughout Utah, but individuals are rarely seen because of their secretive nature. Seasonally, their movements follow their main prey—mule deer. Cougar will also feed on rabbits, elk, or other animals, but about 80 percent of their diet consists of deer. Cougars are active year-round, during day and night, although most activity occurs at dawn and dusk. They are hunted on a limited and closely monitored basis in Utah (UDWR 1999c).

Furbearers

Several furbearer species are found in the field office and are managed according to Utah Furbearers Regulations. Furbearers, as defined by the UDWR, include bobcats, raccoons, badgers, weasels, and beavers. Bobcats are fairly common in Utah, but are rarely seen because of their secretive nature.

Upland Game

Upland game species throughout the planning area include Gambel's quail, blue grouse, mourning dove, band-tailed pigeon, ring-necked pheasant, and chukar partridge. In addition to upland bird species, the cottontail rabbit and snowshoe hare are also present. The habitat for these species varies and depends on season of use as well as on availability of food and shelter.

Migratory Birds

The overall decline of some migratory birds is well documented. Reasons for the decline are complex and include such factors as loss of habitat due to fragmentation, alteration, urban expansion, natural disasters; loss or alteration of habitat in non-breeding areas along migratory routes; and brood parasitism (Parrish et al. 2002). Numerous programs have been initiated to combat this decline. The *North American Waterfowl Management Plan* (NAWMP) was adopted by the United States and Canada to address the conservation and restoration of waterfowl and other migratory waterbirds, and their habitats. The international Partners in Flight (PIF) program, is a coordinated effort to document and reverse apparent declines in the populations of all non-game land birds that breed north of Mexico and then migrate to Mexico, Central and South America, or the Caribbean in the winter months. Executive Order 13186, signed in 2001, requires all federal agencies that might have a measurable negative effect on migratory birds to develop a Memorandum of Understanding (MOU) with the USFWS to promote the recommendations of NAWMP, the North American Bird Conservation Initiative, the North American Bird Conservation Act, and other migratory bird programs. The executive order further requires federal agencies to consider the effects that planned or authorized activities will have on migratory birds and their habitats and to consider migratory birds in their land use planning efforts.

The Intermountain West Joint Venture (IWJV) was established to coordinate implementation and achievement of population and habitat objectives of the NAWMP within parts of 11 Western states, including all of Utah. In 2005, IWJV partners within the State of Utah merged and synthesized habitat goals and objectives of existing bird conservation plans into a coordinated planning document, entitled *Coordinated Implementation Plan for Bird Conservation in Utah*, which reflects the habitat priorities of all bird conservation programs in Utah. The plan identifies portions of three Bird Habitat Conservation Areas (BHCA) that occur within the planning area. Although BHCAs carry no authority, they are recognized by agencies as areas that contain important habitat for some species. In 1993 a PIF program in Utah was established to address the status of avian populations within the state and to provide data relevant to issues concerning the status of neotropical migratory birds. In addition, the USFWS, in compliance with the Fish and Wildlife Conservation Act, published *Birds of Conservation Concern 2002*, a report that identifies migratory and non-migratory bird species (beyond those already designated as federally threatened or endangered) that have the highest need for conservation initiatives.

To date, these reports identify more than 400 species of birds within the State of Utah. Of these 400 species, 231 have been recognized as regular breeders in the state and in need of consideration in the Utah Avian Conservation Strategy process. Of these 231 species, 132 (57%) are neotropical migratory birds, and 29 (12%) are considered state sensitive species, 2 of which are also federally listed as endangered and 4 of which are federally listed as threatened (Parrish et al. 2002). Primary and secondary breeding habitat preferences were identified for each of the 231 species. Primary habitat is considered to be the nesting habitat most commonly used by a species; secondary breeding habitat is the second most common. Winter habitat preferences were also identified.

Table 3-14 identifies both migratory and non-migratory species that could occur within the planning area; PIF or the USFWS have identified these species as needing special conservation actions. Conservation areas are based on species' primary and secondary habitat types and those habitat types that occur within

the planning area. Table 3-14 also identifies species' primary, secondary, and winter habitats (habitat types have been combined within the vegetation categories identified in the Vegetation section of this document). To distinguish those species in relation to the planning area, a compilation of species identified in the documents mentioned above was created and was intersected with the Colorado Plateau physiographic region identified by the PIF program.

Table 3-14. Migratory and Non-Migratory Bird Species

Species	PIF Priority Species	FWS Birds of Conservation Concern	Primary Breeding Habitat	Secondary Breeding Habitat	Winter Habitat
American Avocet	X	X	Riparian/Wetland	Non-Vegetated	Migrant
Bald Eagle ¹			Riparian/Wetland	Other	Riparian/Wetland
Bendire's Thrasher	X	X	Desert Scrub	Desert Scrub	Migrant
Black-Chinned Sparrow		X	Desert Scrub	Desert Scrub	Migrant
Black-Throated Gray Warbler	X	X	Pinyon-Juniper Woodland	Oak/Mountain Shrub	Migrant
Brewer's Sparrow	X	X	Sagebrush Steppe	Desert Scrub	Migrant
Broad-Tailed Hummingbird	X		Riparian/Wetland	Riparian/Wetland	Migrant
Burrowing Owl ¹			Desert Scrub	Sagebrush Steppe	Migrant
California Condor ¹			Non-Vegetated	N/A	Desert Scrub
Ferruginous Hawk ¹	X	X	Pinyon-Juniper Woodland	Sagebrush Steppe	Sagebrush Steppe
Flammulated Owl		X	Ponderosa Pine	Mixed Conifer	Migrant
Gambel's Quail	X		Desert Scrub	Riparian/Wetland	Desert Scrub
Golden Eagle		X	Non-Vegetated	Desert Scrub	Desert Scrub
Grace's Warbler		X	Ponderosa Pine	Mixed Conifer	Migrant
Grasshopper Sparrow ¹			Sagebrush Steppe	Sagebrush Steppe	Migrant
Gray Vireo	X	X	Pinyon-Juniper Woodland	Oak/Mountain Shrub	Migrant
Greater Sage-Grouse ¹	X	X	Sagebrush Steppe	Sagebrush Steppe	Sagebrush Steppe
Lewis's Woodpecker ¹	X	X	Ponderosa Pine	Riparian/Wetland	Oak/Mountain Shrub
Loggerhead Shrike		X	Desert Scrub	Pinyon-Juniper Woodland	Desert Scrub
Long-Billed Curlew ¹	X	X	Sagebrush Steppe	Other	Migrant
Lucy's Warbler	X		Riparian/Wetland	Desert Scrub	Migrant

Species	PIF Priority Species	FWS Birds of Conservation Concern	Primary Breeding Habitat	Secondary Breeding Habitat	Winter Habitat
Mexican Spotted Owl ¹	X		Non-Vegetated	Non-Vegetated	Non-Vegetated
Mountain Plover ¹	X	X	Desert Scrub	Desert Scrub	Migrant
Northern Goshawk ¹			Ponderosa Pine	Aspen	Riparian/Wetland
Northern Harrier		X	Riparian/Wetland	Desert Scrub	Other
Peregrine Falcon ¹		X	Non-Vegetated	Riparian/Wetland	Riparian/Wetland
Pinyon Jay		X	Pinyon-Juniper Woodland	Ponderosa Pine	Pinyon-Juniper Woodland
Prairie Falcon		X	Non-Vegetated	Desert Scrub	Other
Pygmy Nuthatch		X	Ponderosa Pine	Aspen	Ponderosa Pine
Red-Naped Sapsucker		X	Aspen	Mixed Conifer	Riparian/Wetland
Sage Sparrow	X	X	Sagebrush Steppe	Desert Scrub	Desert Scrub
Short-Eared Owl ¹			Wetland/Riparian	Sagebrush Steppe	Other
Snowy Plover		X	Non-Vegetated	Non-Vegetated	Migrant
Southwestern Willow Flycatcher ¹			Riparian/Wetland	Riparian/Wetland	Migrant
Swainson's Hawk ¹		X	Other	Aspen	Migrant
Virginia's Warbler	X	X	Oak/Mountain Shrub	Pinyon-Juniper Woodland	Migrant
Williamson Sapsucker ¹		X	Mixed Conifer	Aspen	Migrant
Yellow-Billed Cuckoo ¹	X	X	Riparian/Wetland	Other	Migrant

¹ Federally listed, BLM, or state sensitive species.

Source: IWJV 2005, Parrish et al. 2002, USFWS 2002

Raptors

There are many species of raptors found within the planning area, several of which are offered special protection by the state and/or Federal Government. These raptor species are discussed further in the Special Status Species section. Raptors are also commonly migratory species. The Migratory Birds section above also addressed raptors in relation to their nature as migratory birds. Special habitat needs for these raptor species include the protection of nest sites, foraging areas, and roosting or resting sites. Specifically, there are raptors in the Pugh Canyon area (Golden eagle and peregrine falcon) that are especially sensitive to disturbances from OHV use in the area. Buffer zones are usually recommended around raptor nest sites during the early spring and summer when raptors are raising their young. Annual raptor inventories monitor raptor nests and populations. This includes monitoring active nests, as well as raptor nests in various conditions of inactivity or abandonment.

Special habitat needs relative to raptors are generally associated with limiting disturbance during the nesting season and maintaining small mammal populations as a prey base. Electrocution from powerlines and environmental contaminants continue to be a threat to some raptor species in the decision area.

Other Wildlife Species

There is a lack of information on small mammals, such as rodents and bats, as well as on amphibians and reptiles in the planning area. Databases maintained by the Utah Natural Heritage Program document general occurrences and the potential for many of these groups of wildlife, but site-specific inventories have not been conducted for most of the field office. However, as inventories are conducted, new occurrences and range extensions are being discovered.

Fish Species

Fisheries habitat includes perennial and intermittent streams that support fish through at least a portion of the year. The condition of fisheries habitat is related to riparian habitat and stream channel characteristics. Previous stocking efforts have established many nonnative fish species in streams, lakes, and reservoirs. Aquatic invertebrates and amphibians are integral components of warm and cold fish communities.

3.2.8 Wildland Fire Ecology

Fire is an inherent component of ecosystems and historically has played an important role in the promotion of plant succession and the development of plant community character. Control of fires during the past century has changed plant communities and resulted in conditions that may sustain large-scale fires when natural ignition of vegetation occurs.

Fires within the planning area are both naturally occurring and used as a management tool. Naturally occurring fires are widely distributed in terms of frequency and severity. Historically, the area has displayed a moderate to high frequency of fires, averaging 47 fires per year and burning an average of 573 acres per year. During the 10-year period 1991–2001, the planning area averaged 86 fires per year, burning an average of 448 acres annually.

Sources of Fire

The weather and fuel structure in the planning area provide an opportunity for ignition from frequent summer storms. Lightning accounts for at least 78 percent of all fire starts. Careless smoking, vehicle exhaust, escaped agricultural burning, and unattended campfires account for the majority of human-caused fires. Equipment usage is also responsible for starting some fires.

Range of Potential Fire Behavior

Fires typically are categorized on the basis of period of occurrence, size class, regime, and condition class. The fire season for the planning area is usually late April to early November. The most critical fire conditions correspond with the hot summer period, which is characterized by low moisture and late-summer thunderstorms. Over the decade for which data are available (1991–2001), the large majority of wildfires have been less than 0.1 acre in size. From 1991 to 2001, more than 99 percent of the wildfires that occurred within the planning area were Size Class A (0.25 acre), B (0.25–10 acres), C (10–99 acres), or D (100–299 acres) incidents (Table 3-15). Only two wildfires were representative of the other three size classes (E, 300–999 acres, F, 1,000–4,000 acres, G, greater than 5,000 acres).

Table 3-15. Fire Occurrence (Size and Acreage), 1991-2001

Size Class	A	B	C	D	E	F	G
# Fires	604	222	26	9	1	1	0
# Acres	64	295	850	1,343	724	1,204	0

Source: Kanab Field Office Files

The five fire regime classes reflect the frequency and severity of burns (Table 3-16). Historically, the most prolific firespread events have been wind-driven, especially in the brush plant cover types. Plume-dominated fires have occurred, particularly during very dry years in the older stands of pinyon-juniper and mixed conifer stands. Rates of firespread through the canopies of sagebrush can exceed 3 miles per hour, while the rate of firespread through mixed conifer and pinyon-juniper stands of 0.5 mile per hour are not uncommon. Periods of better-than-average moisture tend to keep the light fuels (i.e., grasses) green, which helps curtail firespread. The invasion of annual grasses, such as cheatgrass, is changing the fire environment by altering the frequency of fire in fire regimes composed of native vegetation. Light fuels available to burn through the height of the fire season are becoming more abundant by way of the species morphology. Much of the timbered land in the planning area experiences long intervals between fire events. Burn severity in these communities tends to be moderate to severe, resulting in stand replacement of the dominant species. Examples of these vegetation types are high-elevation subalpine fir and spruce and some pinyon-juniper stands in the western portion of the planning area. Examples of a more moderate to frequent return interval are sage/grasslands and lower elevation shrub communities.

Table 3-16. Fire Regimes Within the Planning Area

Fire Regime	Acres	Percent
I (0–35 year frequency and low- to mixed-severity surface fires most common)	907,000	31
II (0–35 year frequency and high-severity–stand-replacement fires)	1,258,000	43
III (35–100+ year frequency and mixed-severity fires)	2,800	<1
IV (35–100+ year frequency and high-severity–stand-replacement fires)	114,900	4
V (>200 year frequency and high-severity–stand-replacement fires)	496,800	17
Unclassified	132,100	5

Source: Kanab Field Office Files

Table 3-17 shows the acreages within the planning area for condition classes defined in terms of the relative risk of losing one or more key components that define an ecological system based on five ecosystem attributes—disturbance regimes (patterns and frequency of insect, disease, fire), disturbance agents, smoke production, hydrologic function (sedimentation, stream flow), and vegetation attributes (composition, structure, and resilience to disturbance agents).

Table 3-17. Condition Class Definitions and Acreages

Condition Class	Fire Regime Example Management Options
Condition Class 1 Acres: 243,200 8 percent of planning area	Fire regimes are within an historical range and the risk of losing key ecosystem components is low. Vegetation attributes (species composition and structure) are intact and functioning within an historical range. Where appropriate, these areas can be maintained within the historical fire regime by treatments such as fire use.

Condition Class	Fire Regime Example Management Options
Condition Class 2 Acres: 598,900 21 percent of planning area	Fire regimes have been moderately altered from their historical range. The risk of losing key ecosystem components is moderate. Fire frequencies have departed from historical frequencies by one or more return intervals (either increased or decreased). This results in moderate changes to one or more of the following: fire size, intensity, and severity, and landscape patterns. Vegetation attributes have been moderately altered from their historical range. Where appropriate, these areas may need moderate levels of restoration treatments, such as fire use and hand or mechanical treatments, to be restored to the historical fire regime.
Condition Class 3 Acres: 1,937,400 67 percent of planning area	Fire regimes have been significantly altered from their historical range. The risk of losing key ecosystem components is high. Fire frequencies have departed from historical frequencies by multiple return intervals. This results in dramatic changes to one or more of the following: fire size, intensity, and severity, and landscape patterns. Vegetation attributes have been significantly altered from their historical range. Where appropriate, these areas may need high levels of restoration treatments, such as hand or mechanical treatments, before fire can be used to restore the historical fire regime.
Unclassified Acres: 131,700 4 percent of planning area	The unclassified category includes five SWReGAP land cover types that are not conducive to being ranked in a fire regime. Unclassified land cover types include barren, lava, urban, water, and agricultural.

Source: Kanab Field Office Files

Types of Vegetation Susceptible to Fire

Wildfire in many of Utah's vegetation communities was historically a regular occurrence that helped define species composition, structure, and productivity (Bradley et al. 1992, Paysen et al. 2000). Thus, many plants that make up these communities are adapted to withstand wildland fire. Grasslands, sagebrush, mountain shrub, aspen, and mixed conifer forests are examples of fire-adapted communities in Utah. In contrast, frequent wildland fire is not part of the normal ecology of other vegetation communities with long fire return intervals, such as salt desert scrub and blackbrush, which typically are not dominated by fire-adapted species (Paysen et al. 2000). Fire in these communities is generally viewed as detrimental because plant succession may take decades to recover, and in some instances may never recover.

The presence of invasive nonnative species can alter the resource character and values across the landscape. The presence of large populations of invasive annual grasses (e.g., cheatgrass) are known to alter (i.e., shorten) fire return intervals and may expand their range and coverage after fires. For additional descriptions of these invasive vegetation types in the planning area, refer to the Vegetation section.

Salt Desert Scrub

Salt desert scrub is characterized by salt-tolerant succulent shrubs, including greasewood, ephedra, shadscale, fourwing saltbush, and threadleaf rubber rabbitbrush. Common grasses include inland saltgrass, alkali sacaton, bottlebrush squirreltail, and Indian ricegrass. The invasive species, cheatgrass, halogeton, tall peppergrass, Russian thistle, and Russian knapweed, can be found either scattered throughout or predominant within salt desert scrub, which generally has low productivity, naturally sparse understory vegetation, and light fuels.

Fire frequency has been estimated at 35 to more than 300 years for the salt desert scrub vegetation type and is classified as Fire Regime V. Because of the risk of losing key ecosystem components and of the risk of greatly increased fire regimes as invasive annual grasses dominate, salt desert scrub is typically classified as Fire Regime Condition Class (FRCC) 3.

A lack of continuous cover (fuels) made fire rare to nonexistent in salt desert scrub communities. Historically, these communities did not burn often enough or in patches large enough to support dominance of fire-adapted plants. Most salt desert scrub species do not readily regenerate following fire. At present, cheatgrass has invaded large portions of Utah's salt desert scrub communities, and now provides sufficient fuel loading to support large, fast-moving fires. Where cheatgrass has invaded, native salt desert scrub communities have been permanently lost or are at high risk of being lost. Further expansion of invasive species (e.g., cheatgrass, tall peppergrass, and Russian knapweed) following fire is a major concern for salt desert scrub communities.

Pinyon-Juniper Woodland

The relatively vast area covered by this vegetation type is in part due to previous (< 100 years ago) overgrazing (which reduces competition) and historic fire suppression in range communities—primarily in grasslands and sagebrush and, to a lesser extent, in forested communities. It is estimated that pinyon-juniper woodlands have increased 10-fold over the past 130 years throughout the Intermountain West (Miller and Tausch 2001). Old-growth pinyon-juniper woodland is estimated to be less than 10 percent of the current area classified as pinyon-juniper woodland (Miller and Tausch 2001). These old-growth areas are often restricted to fire-safe habitats (e.g., steep, dissected and rocky terrain, and in areas with thin, substrates along ridges).

Fire frequency has been estimated at 200 to more than 300 years for old-growth pinyon-juniper (Romme et al. 2002 and Goodrich and Barber 1999) and would be classified as Fire Regime V. Most of the area where pinyon-juniper woodland currently dominates was historically characterized by fires burning approximately every 20 to 100 years (Kitchen 2004, Miller and Tausch 2001); this would characterize the Fire Regime as II. These areas in Utah are typically described by FRCC 2 (greater than 7,000 feet in elevation) or FRCC 3 (less than 7,000 feet). FRCC 3 areas are characterized by dense stands of pinyon and juniper, scarce understory, and high potential for cheatgrass invasion following fire. FRCC 2 areas are encroached pinyon-juniper woodland, but are less dense than in FRCC 3 areas and are at less risk of cheatgrass invasion following fire.

Because juniper is a non-sprouter and is thin-barked when young, fire was the major historical cause of destruction for young juniper trees. However, adult juniper trees in mature stands are difficult to burn because the understory is usually sparse (older trees succumb to fire when 60 percent of the crown is scorched). Pure juniper stands need 35 mph winds or greater to carry wind through the canopy (Winward et al. 1997). Fire is known to have been the most important natural disturbance that affected the distribution of juniper and/or pinyon-juniper woodlands before the introduction of livestock in the 19th century (Miller and Rose 1999). Burkhardt and Tisdale (1976) and Tirmenstein (1999) concluded that fire frequencies of 30 to 40 years would help keep juniper from expanding into mountain big sagebrush communities.

Sagebrush

Fire frequency varies for the different sagebrush species and subspecies, but is considered to be between 20 and 100 years depending on precipitation, elevation, sagebrush species, and associated vegetation. Although sagebrush does not resprout with fire, it is a prolific seeder, and studies show that burned soil and sagebrush seed have higher germination rates. Pre-European settlement stand-replacing fire frequencies for low-elevation sagebrush are estimated to vary from 60 to 110 years (Whisenant 1990, Peters and Bunting 1994, Miller et al. 2001). For mountain big sagebrush, pre-European settlement stand-replacing fire frequencies have been estimated to vary between 10 and 25 years (Houston 1973, Harniss and Murray 1973). Sagebrush, characterized by Fire Regime II, is considered to be generally a FRCC 2

area if it is above 6,500 feet and FRCC 3 if it is below 6,500 feet because of the high risk of losing key ecosystem components following fire due to cheatgrass invasion.

Most sagebrush species do not sprout after fire and most plants are killed by low- to high-intensity fires. This is true of all three subspecies of big sagebrush common throughout Utah. Generally, the herbaceous understory composition does not determine the intensity and severity of wildland fires—sagebrush itself is the primary fire carrier. The high canopy cover associated with late, mature sagebrush stands likely facilitated historic stand-replacing fires. However, the pre-fire understory is an important determinant of post-fire response. A sagebrush stand with a robust understory of native grasses and forbs would generally be replaced after fire with native perennial grassland. Degraded sagebrush stands with poorly evolved native understories are most vulnerable to colonization by invasive species after fire. Because sagebrush seeds generally are not transported far from the parent plant, unburned areas within large burn areas are often the most important source of seed material for natural recruitment and re-establishment of sagebrush (Tirmenstein 1999, Howard 1999, Johnson 2000).

Grasslands

Grassland types include native perennial grasslands, seedings of native species, exotic perennial grasses (primarily crested wheatgrass), and some cheatgrass. A discussion on cheatgrass is included in this section because of its significant role in Utah's grassland ecology.

Because native grasslands are often seral to sagebrush, fire regimes are similar—Fire Regime II. Perennial grasses respond vigorously to fires of various severities by resprouting from basal growing points following fire. The primary determinant of fire response in native perennial grasslands is fire residence time. Fast, high-intensity fires have a short residence time and seldom cause substantial mortality to native perennial bunchgrasses. Slow backing fires have a longer residence time and greater severity; mortality to native perennial bunchgrasses may be high under these conditions. With most natural ignitions, the predominant firespread would be as fast-moving as headfire.

Wherever cheatgrass dominates, the prevailing FRCC is 3 due to the loss of key ecosystem components such as native species. The fire regime of cheatgrass-dominated sites is the historical fire regime of that site before it was invaded by cheatgrass. Where cheatgrass has invaded a salt desert scrub community, the fire regime would be Fire Regime V.

The establishment of cheatgrass in a wildland community fosters much more frequent fire return intervals by extending the time during which the community is susceptible to wildland fire ignitions. In the summer, cheatgrass dries out 4 to 6 weeks earlier than perennial grasses and forms a fine-textured, highly flammable fuel. After cheatgrass dominates a site, the fire regime is altered to more frequent stand-replacing fires such as the cheatgrass fire regime. Shortened natural and historical fire rotations affect perennial vegetation by killing the tops of the plants and allowing less time and fewer growing seasons between recurrent fires. Cheatgrass seed production can be affected by prescribed fire when it is applied during the brief period between the purple stage and the stage when the seeds are dropped.

Blackbrush

Historically, fires in blackbrush were infrequent. This ecosystem is at moderate risk of losing key ecosystem components due to fire. It is characterized by Fire Regime V and FRCC 2. After cheatgrass dominates a blackbrush site, the site is then FRCC 3. Recent experience on Utah BLM land has shown that blackbrush does not respond favorably to fire. In addition, most of the blackbrush in Utah has suffered substantial dieback due to recent drought conditions. Burning has promoted succession to grassland by destroying the biological crust that stabilizes the soil. The biological crust provides

important soil microflora that apparently are required for blackbrush survival or reestablishment (Paysen et al. 2000). Frequent large fires can be problematic from a management standpoint because recovery can take more than 4 decades or, in some cases, there is no recovery (Wright and Bailey 1982, Paysen et al. 2000). Blackbrush is often found in monocultures with little occurrence of other plants present; therefore, seedbanks are often deprived of other plant species.

Mountain Shrub

Mountain shrub is a highly diverse community made up in part of Gambel oak, chokecherry, serviceberry, currant, mountain snowberry, elderberry, bitterbrush, and mountain sagebrush. Stand-replacing fire frequency ranges from 25 to 100 years in mountain shrub (Gruell and Loope 1974), although return intervals may vary widely with elevation, aspect, site moisture, and the associated forest or woodland type. Mountain shrubs are classified as Fire Regimes I, II, and IV depending on the dominant species. FRCCs also vary with the dominant species, although most mountain shrub communities are in FRCC 2 because of some missed fire return intervals, moderate risk of losing key ecosystem components, and moderately altered vegetation attributes. However, some mountain shrub communities at lower elevations (less than 6,500 feet) are classified as FRCC 3 because of the high risk of cheatgrass invasion following fire.

Most species of mountain shrubs resprout following low- to moderate-severity fire. Sprouting mountain shrub communities generally recover following wildland fire and are considered fire tolerant. Mountain sagebrush and bitterbrush do not resprout and, depending on the severity of the fire, may be completely removed from a site. Evidence shows that bitterbrush may benefit from low-severity fire (Winward et al. 1997).

Mixed Conifer

Major forest community types of mixed conifer include Douglas fir, lodgepole pine, Englemann spruce, and subalpine fir (although none of these species except Douglas fir grow in the decision area). Fire frequencies in mixed conifer forests range from 100 to 300 years. These forests are characterized by a combination of understory and complete stand-replacement fire regimes (Arno 2000). Mixed conifer is classified as Fire Regime III or IV depending on elevation and related dominant species. For example, conifer-shrub communities that occur at lower elevations that have pure conifer stands would be characterized by Fire Regime III. Because of the longer historic fire return intervals and well-functioning vegetation attributes, mixed conifer is classified as FRCC 1 when associated with Fire Regime IV, and as FRCC 2 when associated with Fire Regime III.

This mixed-severity fire regime often results in a mosaic pattern of stand structure and fuels. Past stand burn mosaics tend to increase the probability that subsequent fires will also burn in a mixed pattern (Arno 2000). Dead woody fuels often accumulate on the ground in a haphazard manner. The greatest fuel loadings tend to occur on the most productive sites, which are predominantly stand-replacement fire regimes.

Ponderosa Pine

Fire frequency for ponderosa pine communities ranges from 5 to 25 years, with low- to mixed-severity fires. Ponderosa pine forests in Utah are classified as Fire Regime I and FRCC 3. These forests have typically missed between 5 and 10 fire cycles in the years of fire suppression and could be at risk for cheatgrass invasion if not properly managed. Otherwise, the associated understory species exclude cheatgrass. Ponderosa pines have thick bark, which protects them from serious damage from surface fires; it is considered the most fire-adapted conifer in the West (Bradley et al. 1992).

Riparian and Wetland

Historically, fire in riparian communities would have been infrequent, variable, and small in size. Highly mosaic burn patterns would have resulted from the higher moisture content that is generally present in riparian areas and species, but stand-replacing burns would likely have occurred only during extreme drought periods. These riparian communities are in a Fire Regime IV with most areas presently in FRCCs 2 and 3. Lower elevation riparian areas would be in FRCC 3 because of the higher incidence and potential of invasive species.

Fremont cottonwood communities are characterized by a late seral stage (e.g., all mature to late-mature trees) with little or no representation of younger age classes and are not typically fire-adapted. Narrowleaf cottonwood is a somewhat fire-adapted species that may resprout from roots if the stands are not decadent and they occur in areas where the water table remains reasonably high throughout the growing season. The life history and ecology of cottonwoods are intimately tied to flooding, erosion, and deposition on the floodplains because the seeds germinate and establish only on bare, moist alluvium. Willow species typically sprout vigorously following a fast-moving fire. Slow-moving fires are generally more damaging, presumably due to greater heat transfer to root crowns.

Aspen

Fire frequencies in aspen range between 25 to 100 years with mixed severity (Gruell and Loope 1974). Aspen is characterized by Fire Regime IV and FRCC 2. Fire regimes and vegetation structure have been moderately altered from historical conditions. Pure stands of aspen are particularly susceptible to mortality of aboveground stems from fire of low severity even though aspen is well adapted to regeneration by sprouting after fire (Jones and DeByle 1985, Mutch 1970). Aspen stands do not easily burn and often act as natural fuelbreaks during wildland fires. Fires in young aspen stands tend to be low-intensity surface fires unless there is a large amount of understory fuel. In older stands, during the warmest and/or driest months of the year, abundant fuels can lead to higher-intensity fires. Decadent aspen stands and other areas with thin, acidic soils may be less vigorous at regenerating via suckering and may tend to support conifers even after fire (Howard 1996).

Characterization

The fuel structure in the planning area is gradually changing as a result of historic management practices and invasion of nonnative annual grasses, primarily cheatgrass (*Bromus tectorum*). In areas where fuels are continuous, there is the potential for fires to spread rapidly during the height of the average fire season. Much of this area is typically grouped in Fire Regimes I and II, but many of the pinyon and juniper stands have much older stand characteristics, which often have heavier fuel accumulations and burn with stand-replacement fire behavior. There are many areas where sparse fuels and other natural barriers limit fire spread. Most are dry sites where the vegetation is of a moderate to old age class distribution.

The moderate to long return fire interval, fire exclusion and other management practices, and increased human use and incursion into these areas have rendered many of the forested areas in peril of large severe wildland fires. These forests have achieved a level of vegetation stocking and dead and down fuel loads to exacerbate large fire spread through the dry seasons of the year. Recent insect and wind episodes have increased fuel loadings in localized areas to critical levels.

3.2.9 Cultural Resources

Cultural resources are sensitive, irreplaceable resources with potential public and scientific uses, and are an important and integral part of our national heritage. Cultural resources constitute “a definite location of human activity, occupation, or use identifiable through field inventories (i.e., surveys), historical documentation, or oral evidence” (BLM-M-8110). The term “cultural resource” also includes “historic, or architectural sites, structures, or places with important public and scientific uses, and may include definite locations (i.e., sites or places) of traditional cultural or religious importance to specified social and/or cultural groups. Cultural resources are concrete, material places and things that are located, classified, ranked, and managed through the system of identifying, protecting, and utilizing for public benefit” (BLM-M-8110). Archaeological resources, a subset of cultural resources, are “any material remains of human life or activities that are at least 100 years of age, and that are of archaeological interest” as further defined in 43 CFR 7.3. Native American religious concerns, a critical element noted in Appendix 5 of the BLM National Environmental Policy Act (NEPA) handbook, are addressed in the Social and Economic features section 3.5.2.

Current Conditions

Within the decision area, a variety of cultural resource site types attributed to culturally distinct chronological periods ranging from more than 10,000 years ago to the present have been discovered and there is a high potential for finding additional resources. Archaeological investigations started with the Harvard-sponsored Claflin-Emerson expeditions in the late 1920s led by Noel Morss and the 1926 work by Neil Judd (Geib et al. 2001, Janetski 2002). Later work centered around what is called “salvage...and industrial development archaeology” (Geib et al. 2001:41) with the very large Glen Canyon Project, which included archaeological survey and excavation of large areas surrounding what is now Lake Powell. In response to increased coal production and new legislation since the 1970s, inventories have traditionally been conducted to support site-specific surface-disturbing projects, such as mineral and energy development, to comply with the requirements of Section 106 of the National Historic Preservation Act (NHPA) and other cultural resource preservation laws. In addition, academic institutions have performed research excavations, although such scientific investigations were limited. Previous cultural resource inventories have not led to the investigation of the variety of environmental and ecological ranges present, thereby underrepresenting known current cultural resource sites. Intensive cultural resource inventories that meet Utah Class III standards (i.e., 15-meter transect intervals) have been completed on only approximately 57,000 acres.

Within the decision area a total of 1,023 cultural resource sites are listed in the State Historic Preservation Office (SHPO) database. Cultural resources are classified into site types based on physical or cultural characteristics identified as components or occupations. At the broadest level, cultural resource sites are categorized as containing either prehistoric or historic components. Because geographic locations ideal for human use may remain constant from one period to another, Table 3-18 lists both the number of sites with single, identified occupations and the number of identified cultural components, because cultural materials from one site may be attributed to several time periods. In steep, rugged terrain or in extensive sage flats, site densities may be as low as 2–3 sites per square mile. In other areas, especially on benches or terraces near water sources, and in areas favored by the prehistoric Anasazi, site densities may exceed 70 sites per square mile. Prehistoric sites can be associated with one or more of four cultural traditions—Paleo-Indian, Archaic, Formative (Fremont and Ancestral Puebloan), and Post-Formative (Geib et al. 2001). There are 779 prehistoric sites from the various cultural traditions in the decision area. Many of the sites (312) cannot be associated with a specific prehistoric time period. This category usually includes sites with prehistoric artifacts, but that lack any diagnostic artifacts that would enable dating to a specific time period, such as pottery or projectile points. These sites are often small, simple scatters of chipped-stone debris. There are 326 sites that date primarily to the Formative Period. Formative Period sites are

the most archaeologically visible sites with diagnostic artifacts, often with evidence of architecture and pottery. Historic sites are cultural resources in the period following 1776 A.D. and are organized either chronologically or functionally. There are only 27 sites with evidence of historic occupations. Sites with more than one component are listed as multi-component sites, and many sites lack any description of cultural affiliation.

Table 3-18. Cultural Time Periods

Cultural Time Period	Timeframe	# Sites	Median Site Size (acres)*	# Identified Occupations	Characteristics
Paleo-Indian	Before 7,000 B.C.	1	> 1	2	Big-game subsistence patterns. No dated sites from this period, although projectile points from this period have been recovered. Paleo-Indian sites are significant due to scarcity.
Archaic	7,000 B.C. – A.D. 1	92	4.7	104	Hunting and gathering lifestyle likely with well-established seasonal rounds for resource procurement. Projectile points and camps have been found and further discoveries are likely.
Formative	A.D. 1 – A.D. 1250	326	2.3	447	Introduction of bow and arrow, ceramics, and farming with associated sedentary lifestyle and population growth. As a result, more permanent settlements and associated cultural resources remain from these cultures. Scientific uncertainty still remains concerning their origin and disappearance. Identification of additional sites would be scientifically beneficial.
Post-Formative	A.D. 1250 – A.D. 1776	48	1.9	86	Return to hunting-gathering traditions with limited use of ceramics and horticulture. Diagnostic artifacts include small unnotched or side-notched projectile points and Southern Paiute Brownware ceramics. Later traits also include equestrian rock art motifs, European trade goods, wickiups, and a possible increase in the use of obsidian. Identification of additional sites would be beneficial to further research.
Historic	After ca. 1776	27	2.8	50	Euro-American settlement patterns associated with agriculture, homesteading, limited ranching, farming, minerals development, and transportation.
Multi-Component	Multiple	102	3.6		Multi-component sites are sites occupied over at least two identifiable time periods within the same geographical boundaries (e.g., an Anasazi site with a Historic campsite).

Cultural Time Period	Timeframe	# Sites	Median Site Size (acres)*	# Identified Occupations	Characteristics
Unknown Aboriginal	Unknown	312	2.6		Unknown Aboriginal sites are sites with prehistoric-type artifacts, but that lack diagnostic materials, making assignment to a specific prehistoric time period impossible.
No Affiliation	Unknown	115	1.2		No cultural affiliation information is given on the IMACS site form.

* Median size of sites larger than 1 acre.

Sources: Geib et al. 2001, McFadden 1996 and 2001, Spangler 2001, Kanab Field Office Cultural Files, Utah Division of State History Files

The size of the cultural sites was determined using the geographic information system (GIS) database of the KFO. The database codes sites as either points (< 1 acre), polygons (> 1 acre), or lines (linear sites such as roads). Specific size information is not readily available for the 769 sites that are less than 1 acre because they are recorded as points in the GIS dataset. The 249 sites with site size information average 6.5 acres, although the median is only 2.6 acres, and the range is 0.05 acre to 72.2 acres. Table 3-18 breaks out the size by time period. There are only five linear sites, ranging in length from 0.24 mile to 7.8 miles, with an average of 2.1 miles and a mean of 0.7 mile.

Cultural resources, including prehistoric and historic sites, structures, or objects, and places considered important to Native Americans or other cultural groups, are managed according to laws, regulations, and current BLM policy.

Within the decision area, only the Cottonwood Canyon Cliff Dwelling site has formally been listed on the National Register of Historic Places (NRHP), which occurred in 1980. Nearly half of the sites in the decision area (n = 481) have either been recommended as eligible for listing on the NRHP (n = 388) or have been determined to be eligible for listing on the NRHP by the SHPO (n = 93). There are 350 sites that have been recommended not eligible for listing on the NRHP, and thus released from consideration for further protection. In addition, those sites where data are insufficient to make an eligibility determination (n = 171) are treated as though they were eligible until supporting information shows otherwise.

Characterization

Factors regarding cultural resources include the presence and condition of cultural sites, landscapes, or places of traditional use. The trend and forecast of cultural resources in the planning area varies because of the diversity of terrain, geomorphology, access, visibility, and past and current land use patterns. Adherence to Section 106 of the NHPA and the BLM policy of avoiding impacts to cultural resources provides for the continued identification and preservation of cultural resource sites. Research-based surveys and Class II inventories have been conducted, and much information has been obtained to help identify the characteristics of the planning area (Geib et al. 2001, McFadden 1996 and 2001, Spangler 2001). Most surveys take place in compliance with Section 106 of the NHPA, meaning the surveys are conducted as needed to identify cultural resources in a project-specific context and generally are not statistically valid samples of a region.

Exposed sites and their associated artifacts, features, and/or structures are easily disturbed by natural elements such as wind and water erosion, natural deterioration and decay, animal and human intrusion, and development and maintenance activities. Vandalism of the site or collection of cultural artifacts (i.e.,

unauthorized digging and “pothunting”), which are illegal under the Archaeological Resources Protection Act, has been documented. Archaeological and historic sites are known to be deteriorating from a variety of causes. Collectively, these agents have adversely affected many known cultural resources.

More than 57 percent of the recorded cultural resources in the decision area have been judged to be in either “excellent” or “good” condition, no doubt related to the remoteness and the rugged terrain that limit access to many areas. Almost 25 percent are considered to be in “fair” condition, and approximately 7 percent are listed as “poor.” The remaining have no condition information listed.

3.2.10 Paleontological Resources

Paleontological resources constitute a fragile and nonrenewable scientific record of the history of life on earth. It is BLM policy to manage paleontological resources for scientific, educational, and recreational values, and to protect or mitigate these resources from adverse impacts.

Significance of Paleontological Resources Within the Decision Area

The fossils found in the rocks and unconsolidated deposits of the decision area are mostly the remains and traces of terrestrial organisms. The majority of these fossils date to between 65 million and 250 million years ago. This period, known as the Mesozoic, is one of the most fascinating chapters in earth history. Called informally the “Age of Dinosaurs,” the Mesozoic Era saw the rise of mammals, modern snakes and lizards, modern amphibians, dinosaurs, turtles, crocodiles, marine reptiles, birds, flowering plants, and many kinds of insects. Rock layers in the region faithfully record local life and surface conditions on land for much of this time, giving scientists who study fossils (paleontologists) exceptional opportunities to learn more about this crucial time of biological development. Rocks dating to the latter part of the Mesozoic, known as the Cretaceous (65 to 144 million years ago), that crop out in the nearby GSENM have already proven to contain one of the best terrestrial fossil records for this time in the world. Similar rock strata occur in the decision area and have similar potential to help understand these ancient ecosystems that foreshadowed our modern world. Although the scientific value of fossils, especially vertebrates, is what drives many management decisions, these resources are also enjoyed by many in the general public as objects of wonder and beauty. Only scientists from qualified institutions can legally collect vertebrate fossils from public lands.

Paleontological Resources by Geologic Formation

Paleontological resources are integrally associated with the geologic rock units (i.e., formations) in which they are located. Fossils found in one location may be expected to occur elsewhere in the formation along the same stratigraphic horizon (Gillette and Hayden 1997). The geographic extent of the decision area contains approximately 19 formations at the surface, most of which are known to be or are likely to be fossiliferous. A comprehensive paleontological resource inventory of these formations has not been completed within the decision area, but a review of paleontological research on formations contained within the planning area has identified the types of fossil resources that could occur. Table 3-19 identifies these formations, their predominant depositional environments, the types of fossils present, and the formation’s potential to contain paleontological resources. The geologic map of the planning area (Map 3-1) displays these formations in relation to its boundary. It should be noted that the table reflects only the amount of paleontological work conducted in certain areas. Other areas, formations, or facies within a formation may also contain fossils, but have not been examined and evaluated.

Table 3-19. Geologic Formations Present in the Decision Area

Formation Age	Formation Name	Depositional Environment	Fossils Present	Potential
Neogene	Surficial Alluvium and Colluvium	Fluvial, and Lacustrine	Vertebrate	Medium
	Basalt Flows and Cones	Volcanic	Vertebrate	Low
	Surficial Eolian	Eolian	Vertebrate	Low
	Surficial Landslide	Gravitational and Mass Flow	Vertebrate	Low
	Volcanic Rocks (including basalt, rhyolite, andesite, and tuffaceous rocks)	Volcanic	Vertebrate	Low
	Sevier River Formation	Fluvial, Lacustrine	Vertebrate, Invertebrate	Medium
Paleogene	Brianhead Group	Fluvial, Volcanic, and Lacustrine	Invertebrates	Medium
	Claron Formation	Lacustrine and Fluvial	Vertebrate, Invertebrate, Plant, Trace Plant	Medium
Cretaceous	Kaiparowits Formation	Fluvial and Lacustrine	Vertebrate, Invertebrate, Plant, Trace Vertebrate,	High
	Wahweap Formation	Fluvial and Lacustrine	Vertebrate, Invertebrate, Plant, Trace Vertebrate,	High
	Straight Cliffs Sandstone	Fluvial, Coastal Mires, Beach/Marginal Marine, Marine	Vertebrate, Invertebrate, Plant, Trace Vertebrate, Trace invertebrate,	High
	Tropic Shale	Marine	Vertebrate, Invertebrate, Plant, Trace Invertebrate	High
	Dakota Formation	Fluvial, Lacustrine, Coastal Mires, Beach/Marginal Marine, Marine	Vertebrate, Invertebrate, Plant, Trace Plant	High
Jurassic	Henrieville Sandstone	fluvial, Eolian, Beach/Marginal Marine	Plant	Low
	Entrada Sandstone	Eolian, Beach/Marginal Marine, Fluvial	Plant, Trace Vertebrate	Medium
	Carmel Formation/Page Sandstone	Marine, Beach/Marginal Marine, Fluvial	Invertebrate, Plant, Trace Invertebrate, Trace Vertebrate	Medium
	Temple Cap Sandstone	Eolian	None Identified	Medium
	Navajo Sandstone	Eolian, Lacustrine	Vertebrate, Invertebrate, Plant, Trace Vertebrate,	Medium
	Kayenta Formation	Fluvial, Eolian	Vertebrate, Invertebrate, Plant, Trace Vertebrate, Trace invertebrate	High

Formation Age	Formation Name	Depositional Environment	Fossils Present	Potential
Triassic-Jurassic	Moenave Formation	Fluvial, Lacustrine	Vertebrate, Plant, Invertebrate, Trace Vertebrate, Trace Invertebrate	High
Triassic	Chinle Formation	Fluvial, Lacustrine	Vertebrate, Invertebrate, Plant, Trace Vertebrate, Trace Invertebrate	High
	Moenkopi Formation	Beach/Marginal Marine, Marine	Vertebrate, Invertebrate, Plant, Trace Vertebrate	Medium
Permian	Kaibab Limestone	Marine	Vertebrate, Invertebrate	Medium

Sources: Stokes 1986, Hintze 1988, Doelling et al. 1989, Gillette and Hayden 1997, Winkler 1990, Foster et al. 2001, Titus 2005

Paleontological Resources Potential

The potential for paleontological resources varies by formation and within formations. The potential for paleontological resources throughout the region was determined by reviewing published literature, coupled with BLM paleontologist knowledge of unpublished work in the area. Paleontological research not completed in the decision area, but within formations that occur throughout the planning area and the GSENM, provided additional support for determining the paleontological resources potential. Based on this review, it was determined that all surficial deposits had a low potential for fossils based on the general potential for Pleistocene megafauna. Few megafaunal sites are known, but if any with diagnostic material are found, they would be of high significance. Jurassic formations have mostly low-to-moderate potential; Cretaceous formations have high potential for paleontological resources. Site-specific variations within individual formations may result in lower potential in certain areas. As research continues throughout the area, the paleontological potential of such areas will be further refined. The potential for paleontological resources across the planning area is noted through the use of the following three class definitions (Map 3-14):

- **High**—Areas that are known to contain vertebrate fossils or noteworthy occurrences of invertebrate or plant fossils. Consideration of paleontological resources will be necessary if the BLM review of available information indicates that such fossils are present in the area.
- **Medium**—Areas with exposures of geological units or settings that have high potential to contain vertebrate fossils or noteworthy occurrences of invertebrate or plant fossils. The presence of geologic units from which such fossils have been recovered elsewhere may require further assessment of these same units where they are exposed in the area of consideration.
- **Low**—Areas that are very unlikely to produce vertebrate fossils or noteworthy occurrences of invertebrate or plant fossils based on their surficial geology, igneous or metamorphic rocks, extremely young alluvium, colluvium, or aeolian deposits, or the presence of deep soils. However, if possible it should be noted at what depth bedrock may be expected to determine if fossiliferous deposits may be uncovered during surface-disturbing activities.

Paleontological Localities

Reports of fossils throughout the planning area date to the early 20th century. Most of these references to fossil resource locations have no site identification or they provide only vague explanations to fossil locations (Gillette and Hayden 1997). Extensive scientific exploration in the region has increased

dramatically in the past 15 to 20 years (Gillette and Hayden 1997). Most of this research, however, has taken place in the GSENM. As of May 10, 2005, only 19 of the 1,175 Kane County localities contained in the Utah Geological Survey's database are known to occur in the decision area, while more than 950 are documented within the GSENM (Hayden 2005). In Garfield County, there are 846 localities. Two of these, which date back to the mid-20th century, are documented in the decision area, while 538 are in the GSENM (Hayden 2005). It should be noted that 167 localities between the two counties have not had their exact location identified, and thus the land status has not been determined. The lack of localities is not due to the lack of fossils, but to a lack of research. The scientific significance of fossils found adjacent to the decision area on Forest Service lands, state lands, and the GSENM demonstrate the potential for new localities. In addition, field inventories conducted within the decision area have identified scientifically significant specimens. Research of the decision area's paleontological resources has been minimal, but it is expected that as research increases, the number of localities will increase as well.

Fossils in the region represent a diverse array of plants, invertebrates, and vertebrates. Numerous scientifically significant types of specimens have been found on adjacent Forest Service, state, and BLM lands (primarily in the GSENM), in formations that also occur in the decision area. It is anticipated that the demand for paleontological resources for research purposes will continue to be high in the region, with the majority of new localities focused on the GSENM. However, continued research at existing localities, as well as identifying new localities, is anticipated.

3.2.11 Visual Resources

The planning area includes parts of the Colorado Plateau and Colorado Plateau/Basin and Range Transition physiographic provinces, resulting in a broad range of visual settings. Rugged basalt cliffs in the north give way to the sandstone buttes, mesas, canyons, and vistas of the western Grand Staircase physiographic subunit in the south. Other visual features scattered throughout the planning area include sand dunes, vast desert plateaus, and mountain overlooks. Several State Scenic Byways and State Scenic Backways cross portions of the decision area, providing views of the vistas, cliffs, and rural settings. Paria Canyon, along the Arizona border, is a designated wilderness area. The canyon is deep, with steep colorful walls, and is known for its scenic qualities. The proximity of undeveloped landscapes to two national parks, a national monument, a national recreational area (NRA), and four state parks also contributes to the importance of visual resource management (VRM).

The current VRM inventory identifies the existing scenic values in the decision area. The inventory includes an evaluation of scenic quality, analysis of sensitivity, and delineation of distance zones. Based on these three factors BLM-administered lands are placed into one of four VRM inventory classes (Table 3-20). The inventory classes represent the relative value of the visual resources. Class I and Class II resources are the most sensitive, Class III resources are moderately sensitive, and Class IV resources are the least sensitive (Table 3-21).

Table 3-20. VRM Inventory Classes

VRM Inventory Class	Acres
I	21,400
II	165,900
III	169,200
IV	197,500

Table 3-21. Visual Resource Inventory Class Definitions

Classification	Objective
I	To preserve the existing character of the landscape. The level of change to the characteristic landscape should be very low and must not attract attention.
II	To retain the existing character of the landscape. The level of change to the characteristic landscape should be low.
III	To partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate.
IV	To provide for management activities that require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high.

Source: BLM Handbook H-8410-1, Visual Resource Inventory

The decision area contains many areas with a high degree of scenic quality and a high level of visual sensitivity as noted below. Scenic quality is rated as level A, level B, or level C, with level A having the highest scenic quality and level C the lowest. Much of the area has been rated scenic quality level B, which means the area is dominated by a moderate level of visual appeal. The higher mesas and landforms, as well as WSAs, have been rated as level A (high level of visual appeal), a few valleys and lowlands have been rated as level C (low level of visual appeal). In general, high scenic quality within the decision area is a product of the area's varied topography, striking geology, and cultural history. These visual resources are appreciated by the local population as well as by the visiting public, both of whose numbers are steadily increasing. Areas with high visual sensitivity are the result of the high degree of visitor interest in and public concern for a particular area's visual resources, an area's high degree of public visibility, the level of use of an area by the public, and the type of visitor that an area receives. Most of the area has been determined to be moderately to highly sensitive, the most sensitive areas located along the scenic byways and in the most remote, undeveloped areas. Distance zones measure the relative visibility from travel routes or observation points with zone one being the closest to a point or route and zone three being the furthest. Virtually all of the area has been determined to be in distance zones one and two, zone one being along the byways and highways. None of the area has been determined to lie in the "seldom seen" distance zone three.

The main locations within the decision area that have both outstanding scenic quality and high visual sensitivity include, but are not limited to, the following:

- Coral Pink Sand Dunes/Moquith Mountain WSA area (including Water Canyon and Cottonwood Point)
- East Fork of the Virgin River/Parunuweap WSA (including The Barracks)
- North Fork Virgin River/Orderville Canyon WSAs (including Clear Creek Mountain)
- Hog Canyon and Trail Canyon areas
- The White Cliffs
- The Vermilion Cliffs (including Pugh Canyon and Willis Canyon)
- The Pink Cliffs.

There are portions of the decision area that are within the viewshed of Bryce Canyon National Park. To protect the "significant visual resources of the Park as well as its visibility" several areas adjacent to the park were "determined to be unsuitable for surface coal mining operations, including surface impacts incident to underground mining which would be visible from Bryce Canyon National Park" (OSM 1979). This secretarial decision recognizes and protects these scenic values, providing restrictions on coal mining in eight townships adjacent to Bryce Canyon National Park.

There are several areas of high scenic quality and visual sensitivity that are associated with travel corridors and recreational routes within the planning area. There are four Scenic Byways, one All-American Road (National Scenic Byway system), and three State Scenic Byways that pass through the decision area (see Special Designation section for more information). There are also hundreds of miles of trails where users can enjoy the scenery.

3.2.12 Non-WSA Lands with Wilderness Characteristics

Because WSAs were established in the 1980s, designation of wilderness in Utah has become a prominent state and national issue. For more than 20 years, the public has debated about which lands have wilderness characteristics and should be considered by Congress for wilderness designation. As a result of the debate (and significant passage of time since the BLM's original inventories), in 1996 the Secretary of the Interior directed the BLM to take another look at some of the lands in question. In response to the direction of the secretary, the BLM inventoried these lands, and approximately 2.6 million acres of public land statewide (outside existing WSAs) were found to have wilderness characteristics, including the appearance of naturalness and outstanding opportunities for primitive recreation or solitude (1999 *Utah Wilderness Inventory*, BLM 1999a).

In September 2005, the BLM and the State of Utah, the Utah School and Institutional Trust Land Administration, and the Utah Association of Counties (collectively "Utah") reached an agreement negotiated to settle a lawsuit originally brought in 1996 by Utah, challenging the BLM's authority to conduct new wilderness inventories. The settlement stipulated that the BLM's authority to designate new WSAs expired no later than October 21, 1993. The BLM, however, does have the authority to conduct inventories for characteristics associated with the concept of wilderness and to consider management of these values in its land use planning process. The BLM's *Land Use Planning Handbook* (H-1601-1) states that decisions on whether or not to protect wilderness characteristics are to be considered during planning. This section addresses lands outside existing WSAs that have been identified as having wilderness characteristics.

There are areas in the decision area outside existing WSAs that were determined by the BLM in the 1999 *Utah Wilderness Inventory* (BLM 1999a) to have wilderness characteristics. In addition to this, since 1999 and during scoping for this land use plan (LUP), members of the public submitted information suggesting that additional areas outside of existing WSAs have wilderness characteristics and should be managed to preserve those values. A BLM interdisciplinary team evaluated the information for each of these areas to determine if the submitted information presented new information that the BLM had not considered in previous reviews. This evaluation included analysis of topographic maps, a review of 2006 digital aerial photos, other GIS information including county road data (previously verified as part of travel plan formulation), BLM files for such resource uses as range improvements and community pits, and professional judgment. The review identified impacted areas, as well as those areas that appeared relatively free of impacts on naturalness. The Kanab Field Office also made field trips to some of the areas. For these areas, the GIS review was used to confirm the field data. Summaries of these analyses were prepared for each evaluated area.

In evaluating areas for their wilderness characteristics, the Kanab Field Office took into consideration the language of the 1964 Wilderness Act, and concluded that a size criterion is an important indicator of whether or not outstanding opportunities for solitude and/or primitive recreation exist. Areas of less than 5,000 acres are generally not large enough to provide for these opportunities. Also, because the size criterion had been used for all previous wilderness inventories, applying it here allowed for consistency in both application and findings. The size criterion of 5,000 acres was applied only to "stand-alone" units; that is, units not contiguous with other federal lands previously determined to possess wilderness characteristics (e.g., designated wilderness, WSAs, and National Park Service and U.S. Forest Service

lands that are administratively endorsed for wilderness). Units that are contiguous to federal lands with wilderness characteristics as identified above were evaluated for naturalness alone. Opportunities for solitude and primitive recreation were assumed to be present in association with the larger contiguous area.

As a result of the *1999 Utah Wilderness Inventory* and the subsequent interdisciplinary review of new information, the BLM determined that all or portions of 10 non-WSA areas, totaling approximately 89,780 acres, have wilderness characteristics because they appear natural and provide outstanding opportunities for solitude or primitive and unconfined recreation (Table 3-22, Map 3-15). The BLM also determined that 43,135 acres (all of 5 areas and portions of 9 areas) did not have wilderness characteristics. Most of the non-WSA lands with wilderness characteristics (WC areas) are adjacent to existing WSAs or are areas the BLM previously inventoried and identified as having wilderness characteristics. There are no existing fluid mineral leases in these areas.

Table 3-22. Non-WSA Lands Evaluated for Wilderness Characteristics

Area Name	Evaluated Acres Determined <u>Not</u> to Have Wilderness Characteristics¹	Evaluated Acres Determined to Have Wilderness Characteristics¹
Black Hills	2,100	0
Canaan Mountain	3,200	7,000
Carcass Canyon	250	220
East of Bryce	0	860
Heaps Canyon	4,100	0
Little Valley Canyon	4,100	0
Moquith Mountain	1,300	10,900
North Escalante Canyons	40	0
Orderville Canyon	2,300	2,700
Paria/Hackberry	20	0
Paria/Pine Hollow	5	900
Parunuweap Canyon	8,800	5,700
Upper Kanab Creek	1,200	43,600
Vermilion Cliffs	15,400	11,100
Wide Hollow	320	6,800
Total	43,135	89,780
Notes: ¹ Includes acres only in decision area. ² Acres may differ from those identified in Utah Wilderness Inventory (BLM 1999a) due to use of GIS-generated figures.		

Sources: BLM 1999a, Kanab Field Office files

The resource condition of each of the areas listed in Table 3-22 is described below. This includes discussion of the current resource values and uses that are present in each of the areas. The 1999 Utah Wilderness Inventory and wilderness files in the KFO contain additional information on these areas. Evaluated areas that the BLM determined did not contain wilderness characteristics are not addressed further in this document.

Black Hills

The Black Hills area (2,100 acres) is located northwest of Escalante in south-central Garfield County. The area is bordered by the Dixie National Forest on the north and by public lands on the other sides. On public lands, the area is bounded by well-used roads that provide access to the national forest, as well as an approximately 0.25-mile route on the northern edge of the area. The area is characterized by steep ledges and numerous broken sandstone cliffs. Vegetation is dominated by pinyon-juniper woodlands and scattered ponderosa pine. Primary uses of the area include recreational equestrian, hiking, camping, hunting, and livestock grazing. Supplemental values include archaeology, geology, scenic opportunities, and wildlife habitat and viewing.

Canaan Mountain

The Canaan Mountain area is located in eastern Washington and western Kane counties about 30 miles east of St. George. The area is located on the north, south, and east sides of the Canaan Mountain WSA and shares the same rolling foothills and sandy terraces found within the WSA. In addition, some of the area shares a border with Zion National Park lands that are under formal wilderness consideration. The area has a mixture of pinyon-juniper woodland and sagebrush vegetation. The area is used mainly for ranching and recreation, with a considerable amount of OHV use. There are more than 11 miles of routes within areas determined not to have wilderness characteristics (3,200 acres) and 8 miles of routes within the areas determined to have wilderness characteristics (7,000 acres). Approximately 0.8 mile of the Eagle Crags hiking trail is within the area.

Carcass Canyon

The Carcass Canyon area is located in south-central Garfield County, south and southeast of the town of Escalante. Although the inventoried area contains 27,400 acres with wilderness characteristics, most of it is located in the GSENM and is outside the decision area; 220 acres within the decision area have wilderness characteristics. The area is composed mainly of pinyon-juniper woodlands interspersed with sagebrush and grassland benches. The area may contain scattered and inconspicuous fences, earthen stock reservoirs, corrals, salting locations, recreation intrusions, and overgrown seismic lines. There are 3 miles of routes in the portion determined to not have wilderness characteristics (250 acres). The area receives light hiking and hunting use. Lack of vegetative cover and topographic screening reduces opportunities for solitude in lower portions of the area adjacent to the boundary of the unit.

East of Bryce

The East of Bryce area (860 acres) is located in western Garfield County between Bryce Canyon National Park and the town of Tropic. The area is composed entirely of public land. The area consists of a portion of a large mesa providing overviews of Tropic Valley to the east and Bryce Canyon National Park to the west. Several moderate drainages cut into the mesa from the south and east. The vegetation is predominantly pinyon and juniper woodland on the mesa top and finger ridge, with sagebrush and shrubs on the south and east hillsides. The area is used for recreational opportunities, including hiking, backpacking, and photography from access points within Bryce Canyon National Park and the town of Tropic.

Heaps Canyon

The Heaps Canyon area (4,100 acres) is located northwest of Escalante in south-central Garfield County. The area is bordered by the Dixie National Forest on the west and by private land and State Route (SR) 12 on the south, with public lands to the north separated by a well-used road that provides access to the national forest. The area is characterized by steep ledges and numerous broken sandstone cliffs.

Vegetation is dominated by pinyon-juniper woodlands and scattered ponderosa pine. The area is used for recreation (equestrian use, hiking, camping, and hunting) and livestock grazing. Supplemental values include archaeology, geology, scenic opportunities, and wildlife habitat and viewing.

Little Valley Canyon

The Little Valley Canyon area (4,100 acres) is located northwest of Escalante in south-central Garfield County. The area is bordered by the Dixie National Forest and a State of Utah section on the northwest, by private land and a State of Utah section on the southeast, and by public lands on the other two sides separated by well-used roads that provide access to the national forest. The area is characterized by steep ledges and numerous broken sandstone cliffs. Vegetation is dominated by pinyon-juniper woodlands and scattered ponderosa pine. The area is used for recreation (equestrian use, hiking, camping, hunting, and fishing) and livestock grazing. Supplemental values include archaeology, geology, scenic opportunities, and wildlife habitat and viewing.

Moquith Mountain

The Moquith Mountain area is located in Kane County and is bordered by the city of Kanab on the east and by the Moquith Mountain WSA on the west. The area consists primarily of a long high mesa indented by several finger-like canyons and drainages. The Vermilion Cliffs is the most prominent feature in the area, with sandstone escarpments, rimrock mesas, and numerous indented canyons and drainages. The area is currently used for hunting, livestock grazing, OHV riding, and utility access for the Fredonia (Arizona) watershed. There are 5.5 miles of routes within areas determined to not have wilderness characteristics (1,300 acres) and 2 miles in areas determined to have wilderness characteristics (10,900 acres).

North Escalante Canyons

The North Escalante Canyon area is located in central Garfield County south and southeast of the town of Boulder. The area contains 20,900 acres with wilderness characteristics, all of which are within the GSENM and outside the decision area. The 40 acres located in the decision area, directly south of the town of Boulder, were determined to not have wilderness characteristics. The portion of the area in the decision area contains washes and drainages that form a linked network, providing a variety of routes to and from the Escalante River. Hikes to the Escalante River are available throughout the entire area, providing opportunities for primitive recreation and views of scenic landscapes. However, the acreage within the decision area and the adjacent landownership patterns result in the 40 acres not meeting evaluation criteria.

Orderville Canyon

The Orderville Canyon area, comprising several areas, is located in the northwest region of Kane County about 10 miles north of SR 9. Three major areas make up the Orderville Canyon area: one area is located north of Orderville Canyon, another area is south of the canyon, with each of these adjacent to the Orderville Canyon WSA, and the third is located directly east of the North Fork Virgin River WSA. The two areas adjacent to the Orderville Canyon WSA are bordered on the west by Zion National Park. Other boundaries for all three areas include private land and substantial vehicle ways. There is an isolated parcel (approximately 50 acres) in the Jolley Gulch area located between the Parunuweap Canyon WSA and the remainder of the major Orderville Canyon areas. This small unit is located along the western boundary of Kane County; its south and west boundary borders Zion National Park. The unit is located approximately 2 miles north of Highway 9 and is part of a 160-acre parcel of isolated public lands surrounded on the north and east by private land. The area has been proposed for exchange, and local recreation resorts use an OHV route on the boundary of the area for OHV riding to the boundary of Zion National Park. There

are 10 miles of routes within the areas determined not to have wilderness characteristics (2,300 acres) and 9 miles of routes within the areas determined to have wilderness characteristics (2,700 acres).

The area east of the North Fork Virgin River WSA straddles the North Fork of the Virgin River, with a route running along the south side of the river. The terrain slopes gently away from the river and has sparse pinyon and juniper woodlands and understory brush with some ponderosa pine along the lower slopes. The area is a key access point to the narrows hike in Zion National Park and is also used for camping, livestock grazing, and big game hunting.

The areas adjacent to the Orderville Canyon WSA have terrain consisting of steep canyons and drainages, canyon rims, broad hollows, rounded peaks, and flat benches. A pinyon-juniper woodland and ponderosa pine cover most of the inventory area. The understory consists of mountain mahogany, serviceberry, Gambel oak, cliffrose, and silver buffaloberry. The lower portion of the area is covered by mountain shrub vegetation, with oak, big sagebrush, serviceberry, pinyon pine, juniper, and manzanita, with some bitterbrush and rabbitbrush. The areas are used for woodcutting, camping, livestock grazing, big game hunting, and OHV riding.

Paria/Hackberry

The Paria/Hackberry area is located in north central Kane County southeast of the town of Tropic. The entire area contains 25,780 acres with wilderness characteristics, all of which are within the GSENM and outside the decision area. The 20 acres of the inventory unit located in the decision area were determined to not have wilderness characteristics because of the limited size of the area and because its relationship to adjacent landownership patterns did not evaluation criteria.

Paria/Pine Hollow

The Paria/Pine Hollow area (900 acres) is composed of several units adjacent to the Paria Canyon–Vermilion Cliffs Wilderness Area. The area is characterized by canyon uplands, with the tops and edges of mesas bordering the Paria River. Vegetation is composed of salt desert scrubs and shadscale. The 5-acre Pine Hollow area is directly adjacent to the Buckskin Gulch trailhead and is in the bottomland of drainages dominated by sagebrush. Land uses in these areas are largely limited to livestock grazing and primitive recreation, although there is 1 mile of inventoried route within the easternmost Paria unit.

Parunuweap Canyon

The Parunuweap Canyon area is located in Kane County about 20 miles northwest of Kanab. Some of the inventory area is located north and east of Parunuweap Canyon; the remainder is southwest of the canyon. The area is bounded by private land boundaries, roads, well-defined vehicle ways, Parunuweap Canyon WSA, and Zion National Park. The terrain consists of canyon rims and drainages, separated by flat sagebrush bench lands or thick pinyon-juniper woodlands. Pockets of ponderosa pine and sandstone outcroppings are scattered throughout the area. The most prominent feature in the inventory area is Harris Mountain, a topographic formation that extends into the Parunuweap Canyon WSA. The area is currently used for woodcutting, big game hunting, camping, livestock grazing, and OHV riding. There are 42 miles of routes within the areas determined not to have wilderness characteristics (8,800 acres) and 11 miles of routes within areas determined to have wilderness characteristics (5,700 acres).

Upper Kanab Creek

The Upper Kanab Creek area is located 15 miles north and northwest of Kanab. The western portion is adjacent to a number of communities located in Long Valley; the eastern part is within the GSENM. The

Upper Kanab Creek area is exceptionally scenic, forming the backdrop for tourists traveling Highway 89 between Zion National Park, Bryce Canyon National Park, and the North Rim of the Grand Canyon.

Upper Kanab Creek area is divided into two distinct areas by the prominent White Cliffs. These cliffs are one of the principal steps in the Grand Staircase cliff lines between the Grand Canyon and Bryce Canyon. Topography away from the cliffs is characterized by rolling hills and eroded draws. In the open canyons there is a combination of ponderosa pine and areas of colorful sandstone or sand dunes; the lower elevations contain large, dense stands of pinyon and juniper. There are also areas of scattered ponderosa pines and stretches of riparian vegetation along the perennial reaches of Kanab Creek. A large part of the area is north of the wells that supply culinary water for Kanab. The area is used for livestock grazing and recreation. There are approximately 5 miles of routes within the areas determined not to have wilderness characteristics (1,200 acres) and 72 miles of routes within the areas determined to have wilderness characteristics (43,600 acres).

Vermilion Cliffs

The Vermilion Cliffs area is located north and northeast of Kanab between Highway 89 and Johnson Canyon Road. The red sandstone cliffs along the area's southern boundary form the backdrop to the eastern entrance of Kanab along Highway 89. The area is composed of sandstone cliffs, incised valleys, and colorful sandstone outcrops. Vegetation is dominated by pinyon-juniper woodlands, with scattered ponderosa pine and understory brush similar to that in the Upper Kanab Creek area. The area is used for livestock grazing and recreation. The area borders canyons with route systems popular to local and destination OHV use. There are approximately 71 miles of routes within the areas determined not to have wilderness characteristics (15,400 acres) and 4 miles of routes within the areas determined to have wilderness characteristics (11,100 acres).

Wide Hollow

The Wide Hollow area (6,800 acres) is located northwest of Escalante in south-central Garfield County. The area is bordered by the Dixie National Forest on the northwest, by private land on the southeast, and by public lands on the other two sides separated by well-used roads that provide access to the national forest. The area is characterized by steep ledges and numerous broken sandstone cliffs. Vegetation is dominated by pinyon-juniper woodlands and scattered ponderosa pine. Use of the area is dominated by equestrian recreation use, hiking, camping, hunting, fishing, and livestock grazing. There is a 0.1-mile route in the eastern portion of the area. Supplemental values include archaeology, geology, scenic opportunities, and wildlife habitat and viewing.

3.3 RESOURCE USES

The public lands administered by the KFO are managed for multiple uses. Multiple use management includes management for resource uses as well as for resource values. Resource uses involve activities that use the natural, biological, and/or cultural components of the decision area such as mineral development, livestock grazing, forestry and woodland harvest, and recreation. The decision area is viewed as some of the remaining lands in the region where traditional commercial uses and relatively unrestricted recreational activities can still occur. These lands are considered by many to be vital to meeting the developing needs of neighboring communities, private lands, and contributing to the economic and social well-being of the area.

The following sections discuss resource uses in the decision area and include, where information is available, a discussion of the following three factors:

- Current Use—Level and locations of use
- Forecast—Anticipated demand for use—the Reasonably Foreseeable Development (RFD)
- Key features—Areas of high potential for use.

3.3.1 Forestry and Woodland Products

There are approximately 478,000 acres available for forest and woodland product harvest in the decision area. Fuelwood harvest is the most common use of forest or woodland resources in the decision area. Individuals cutting firewood for personal use represents the greatest demand on the woodland resource. Historically, pinyon pine was the preferred species for fuelwood; more recently, juniper is increasingly used for fuelwood. Seasonal Christmas tree harvesting by local residents is also a common use of the woodland resource. Harvesting trees for posts is another type of woodland product use. Trees harvested for posts are generally found on the more productive pinyon-juniper sites where the soils are deep and well drained. These areas are generally associated with pinyon-juniper woodlands that have encroached into the sagebrush steppe.

Table 3-23 shows the amount of woodland products harvested over the past 4 years. Based on existing demand for harvest, forests and woodlands provide ample opportunities to meet continued demand for harvest of woodland products (i.e., posts, fuelwood, and Christmas trees).

Table 3-23. Woodland Product Harvest

Woodland Product	2001	2002	2003	2004	2005	2006
# Cords of Fuelwood	574	462	598	605	386	380
# Cedar Posts	3,553	3,547	2,490	3,347	4,905	3,321
# Christmas Trees	149	142	94	87	143	101

Source: Kanab Field Office Files

3.3.2 Livestock Grazing

The Kanab, Utah, area was settled in the 1860s. Although some farming did occur, settlers found the area more suitable for livestock grazing than for subsistence farming because of the primitive and harsh conditions. There was neither intensive grazing management on the public lands nor established livestock numbers or seasons of use during the early settlement period. As a result, the number of cattle, sheep, and horses rapidly increased until the early 1900s. During this period of rapid stock increase, livestock grazing became a regulated and permitted activity on national forests. Non-forest federal lands continued to be treated as a “commons,” in which those who moved their stock onto the range first each season secured the use of new forage growth. During this period of unregulated use, rangeland resources and ecological conditions experienced significant harm from overgrazing. Overgrazing resulted in changes to vegetation communities, especially at lower elevations that were used for winter grazing. Control of these ranges did not occur until 1934. After enactment of the Taylor Grazing Act in 1934, grazing allotments were created and the number and kind of livestock and season of use were established for the area. In 1946 the BLM was established. During the late 1950s and early 1960s, range surveys were completed on the public lands to determine the amount of forage being produced. Following these surveys, grazing capacity for the allotments was adjudicated. The number of livestock authorized on most of the allotments was decreased to meet sustained rangeland production objectives.

A federal court agreement on April 11, 1975, required the BLM to prepare grazing environmental impact statements (EIS) on public grazing lands over a 10-year period. To comply with this agreement, the Kanab/Escalante Grazing EIS was prepared in 1981, and the data were used to make adjustments in number and season of use.

There are a total of 119 allotments in the decision area (Map 3-16), which include BLM-administered land and land managed by other federal agencies, the State of Utah, and private entities. The KFO has administrative responsibility for the federal acres within these allotments. Table 3-24 lists these allotments, each allotment's federal acreage, the kind of livestock permitted for the allotment, the active permitted use allocated to domestic livestock, and the forage allocated to wildlife.

Table 3-24. Livestock Grazing Allotments

Allotments	Number	Federal Acres	Livestock Kind ¹	Active Livestock Permitted Use (AUMs)	Suspended Livestock Permitted Use (AUMs)	Wildlife Allocation (AUMs)	Total AUMs Allocated ²
Alton	24002	392	C	5	15	5	10
Art Canyon	24003	8,927	C	352	198	344	696
Bald Knoll	24004	6,741	C	215	197	148	363
Barracks Point	24005	8,140	C	170	249	262	432
Big Flat	15031	6,464	C	529	0	*	529
Black Mountain	24007	1,255	C	42	92	78	120
Brown Canyon	24011	1,591	C	122	0	46	168
Buck Knoll	24012	4,134	C	153	116	300	453
Buck Pasture	24013	2,708	C	100	70	64	164
Bunting Canyon	14014	339	C	4	19	6	10
Burnt Cedar Point	24015	3,054	C	105	223	180	285
Burnt Flat	24016	897	C	20	46	48	68
Carmel Junction	24021	3,356	C	14	198	21	35
Cave Creek	24092	645	C	16	0	61	77
Chris Spring	34022	7,265	C	216	473	160	376
Circleville Canyon	00809	4,280	C	88	0	*	88
Clay Flat	24023	5,286	C	210	120	119	329
Coal Hollow	04165	536	C	22	17	**	22
Coal Mine	24024	250	C	4	36	6	10
Cogswell Point	04156	10	C	0	0	**	0
Coop Creek	24025	477	C	20	59	15	35
Cottonwood Spring	24027	7,888	C	555	119	183	738
Cougar Canyon	24028	1,468	C	55	0	36	91
Cove (Alton)	24029	158	C	10	0	21	31
Cove (Circleville)	00810	12,662	C	231	0	9	240
Dog Valley	00812	9,704	C	336	280	*	336
Driveway	00011	860	C	20	0	18	38
Dry Lake	24033	1,796	C	74	46	94	168
Dry Wash	24034	1,977	C, H	206	0	80	286
Dump	24032	215	C	8	72	12	20
Eight Mile Gap	24035	571	C	15	10	27	42

Allotments	Number	Federal Acres	Livestock Kind ¹	Active Livestock Permitted Use (AUMs)	Suspended Livestock Permitted Use (AUMs)	Wildlife Allocation (AUMs)	Total AUMs Allocated ²
Eight Mile Pass	05304	440	C	17	19	**	17
Elbow Springs	24037	2,352	C	50	134	77	127
Elephant Cove	24038	7,604	C	432	194	304	736
F.A.R.	24046	4,492	C	100	422	115	215
Farm Canyon	24040	3,262	C	243	0	122	365
Fish Tail	24042	3,039	C	230	58	87	317
Flume Hollow	24045	806	C	7	42	37	44
Gardner Hollow	24049	2,192	C	30	18	87	117
Glendale Bench	24051	1,735	C	130	0	170	300
Gordon Point	14098	329	C	40	30	47	87
Graveyard Hollow	25048	1,206	S	75	0	*	75
Harris Flat	24058	4,292	C	268	45	181	449
Hawkins Wash	15005	7,878	C	552	165	*	552
Hay Canyon	04155	709	C	50	50	60	110
Hillsdale	25035	1,483	C	140	0	*	140
Hogs Heaven	04154	1,404	C	50	490	136	186
Isolated Tracts	14062	1,028	C	65	16	89	154
John. R. Flat	24063	9,862	C	258	75	291	549
Johnson Spring	00012	618	C	15	0	**	15
Johnson Ranch	24066	5,118	C	265	335	110	375
Kanab Creek	24067	4,023	C	85	266	138	223
Kanab Creek Custodial	00005	65	C	9	39	***	9
Kane Springs	24068	15,271	C	253	651	457	710
Kinnikinnick Spring	14069	5,031	C	90	140	167	257
Levanger Lakes	14070	872	C	33	0	43	76
Limekiln Creek	15029	3,773	C	70	0	*	70
Limestone Canyon	25047	1,535	C	67	0	*	67
Lost Spring	24074	1,028	C	4	0	15	19
Lower Herd	04101	820	C	25	140	61	86
Lower Hog Canyon	14075	2,486	C	52	116	33	85
Lower North Fork	04157	813	C	10	19	36	46
Lower Sink Valley	04112	2,441	C	35	238	***	35
Lydia	24077	2,083	C	58	158	171	229
Lydia's Canyon	24010	466	C	0	0	41	41
Marshall Canyon	25027	909	C	30	0	*	150
Meadow Canyon	24080	6,061	C	25	74	132	157
Mill Creek	00010	12,209	C	301	0	429	730
Muggins Flat	04162	638	C	12	0	13	25
Neuts Canyon	24087	2,419	C	112	62	237	349
North Fork	04160	366	C	15	1	14	29
Oak Springs	14088	2,797	C	87	231	121	208
Old Fort	14089	2,202	C	7	27	20	27
Orderville Gulch	24090	4,824	C	200	50	366	566

Allotments	Number	Federal Acres	Livestock Kind ¹	Active Livestock Permitted Use (AUMs)	Suspended Livestock Permitted Use (AUMs)	Wildlife Allocation (AUMs)	Total AUMs Allocated ²
Pine Spring	24093	8,498	C	448	202	30	478
Poverty Flat	24094	9,603	C	416	0	400	816
Red Butte	24095	5,046	C	196	232	226	422
Red Canyon	14096	11,910	C	448	52	417	865
Red Hollow	14097	1,156	C	40	62	76	116
Red Knoll	04140	5,879	C	175	550	243	418
Robinson Creek	14099	524	C	24	61	37	61
Rock Canyon	25046	8,281	C	484	0	*	484
Rocking Chair	14100	1,572	C	61	92	175	236
Roller Mill	15030	1,883	C	184	0	*	184
Sagehen Hollow	25045	5,812	C	444	147	*	444
Sandy Creek	25052	8,461	C	688	0	*	688
Sanford Bench	25028	9,570	C	1,081	0	*	1,081
Sawmill	25049	539	C	30	0	*	30
Seeps	14107	2,199	C	30	422	281	311
Sethy's Canyon	04108	7,295	C	262	373	224	486
Sevier	15006	652	C	34	40	*	34
Sevier River	25036	2,308	C	340	0	*	340
Shearing Corral	00007	4,023	C	100	0	*	100
Sheep Spring	04142	3,474	C	223	279	111	334
South Canyon	25044	18,355	C	900	0	*	900
Spencer Bench	04113	7,023	C	97	129	160	257
Spring Hollow	04151	573	S	9	0	0	9
Spry	05007	8,528	C	449	302	*	449
Sugar Knoll	04117	2,686	C	112	0	48	160
Sunnyside	04118	410	C	14	0	14	28
Sunset Cliffs	04103	2,014	C	188	0	*	188
Syler Knoll	04122	442	C	6	104	16	22
Table Mountain	04104	2,296	S	89	247	181	270
Tebbs Hollow	25053	3,961	C	319	0	*	319
Thompson Point	04123	1,549	C	64	0	39	103
Three Mile Creek	25051	2,666	C	200	0	*	200
Toms Canyon	04164	240	C	5	0	***	5
Trail Canyon	04125	6,924	C	110	100	158	268
Trail Well	14126	1,329	C, H	88	0	16	104
Upper Hog	04128	4,183	C	100	183	98	198
Upper North Fork	04158	714	C	10	80	73	83
Upper Place	04129	1,581	C	23	29	69	92
Upper Sink Valley	04163	4,806	C	311	134	141	452
Virgin River	04131	3,922	C, H	230	0	122	352
Water Canyon	04132	3,398	C	48	0	51	99
Willis Canyon	04143	1,675	C	16	0	13	29
Yellowjacket	04137	7,378	C	241	998	315	556

Allotments	Number	Federal Acres	Livestock Kind ¹	Active Livestock Permitted Use (AUMs)	Suspended Livestock Permitted Use (AUMs)	Wildlife Allocation (AUMs)	Total AUMs Allocated ²
Zion	04138	11,085	C	270	1167	519	789
Zion Park	04159	1,263	C	0	162	42	42
TOTAL		434,713	-	18,241	13,107	11,045	29,286
Notes: ¹ Livestock Kind Key: C = cattle; H = horse; S = sheep ² Total = Sum of "Active Livestock Permitted Use" and "Wildlife Allocation" * For allotments within the CBGA RMP, big game will be provided 1,220 AUMs of forage in the short term and up to 2,042 AUMs of forage in the long term. However, these AUMs are not allotment specific; they are allotted decision area wide. ** Wildlife AUMs not allotted in these allotments. *** Wildlife AUMs included only in the portion of the decision area administered by KFO.							

Source: Kanab Field Office Grazing Files

In 2004, there were 136 permits to use these allotments. Grazing permits are usually issued for a 10-year period and periodically undergo a renewal process. Active permitted use, or the maximum number of Animal Unit Months (AUM) available for use given appropriate conditions, is identified by permit during this renewal process. Grazing allotments are monitored periodically to ensure proper stocking rates to prevent overgrazing forage on the allotments. In addition, allotments are inventoried periodically and evaluated to determine if standards are being met and if they comply with the *Standards for Rangeland Health*. Livestock grazing is managed in accordance with *Standards for Rangeland Health* and *Guidelines for Grazing Management for BLM Lands in Utah*. By regulation, if the *Standards for Rangeland Health* are not being met, and livestock grazing is determined to be a significant contributing factor, appropriate actions must be taken that will result in significant progress being made toward meeting the standards within timeframes specified in the regulations.

Although active permitted use in the decision area is 18,241 AUMs, active use, which is forage the permittees paid to use in a given season or year, was only 8,895 AUMs (49 percent of active permitted use) during fiscal year 2006. Active use has averaged 42 percent of active permitted use. This discrepancy between active permitted use and active use AUMs is attributable to a number of variables. Seasonal changes in precipitation and temperature result in more or less available forage. Over the last 5 years, the area has experienced severe drought conditions, requiring a reduction in grazing use to maintain range condition. In addition, fluctuations in the beef or sheep markets can make grazing less profitable. Permittees may also take voluntary nonuse for a variety of reasons, resulting in AUMs that are available but not purchased for livestock use. These variables can result in the perception that forage is being underutilized, when actually the range is simply being managed for a sustained forage yield. The majority of forage use is attributed to cattle (more than 97 percent of 116 allotments), with sheep (more than 2 percent of 3 allotments) and horses (more than 2 percent of 3 allotments) comprising the remainder of domestic livestock use. Domestic livestock forage use over the last 13 years is shown in Table 3-25.

Table 3-25. Domestic Livestock Forage Active Use

Year ¹	Number of Operators			Active Use		
	Cattle & Horse	Sheep	Total ²	Cattle & Horse	Sheep & Goats	Total
1994	86	7	86	17,349	246	17,595
1995	88	8	89	19,096	215	19,311
1996	89	8	90	21,677	279	21,956
1997	97	7	96	22,572	379	22,951

Year ¹	Number of Operators			Active Use		
	Cattle & Horse	Sheep	Total ²	Cattle & Horse	Sheep & Goats	Total
1998	94	8	94	21,486	215	21,701
1999	92	8	94	19,013	215	19,228
2000 ³	77	7	81	8,304	197	8,501
2001 ³	74	6	77	10,653	153	10,806
2002 ³	73	6	77	6,431	161	6,592
2003 ³	68	6	74	4,831	163	4,994
2004 ³	66	2	68	6,005	92	6,097
2005 ³	75	3	77	8,114	115	8,229
2006 ³	83	3	84	8,763	132	8,895
Average⁴	73.7	4.7	76.9	7,585.9	144.7	7,731
Notes: ¹ Figures are by Federal Government fiscal year (October 1–September 30). ² Difference between total permits and operators denotes some operators with multiple permits. ³ The 1996 designation of GSENM did not reduce the number of allotments administered by the KFO until FY 2000. Current administration of allotments by GSENM and KFO began in FY 2000. Prior to FY 2000 use figures include the existing decision area and GSENM. After FY 2000 (inclusive), use data represent livestock grazing only in the decision area administered by the KFO. ⁴ Average is limited to the last seven years of sole Kanab Field Office administration. It should be noted that trends extrapolated from these data are not necessarily representative of average conditions, as the area experienced drought conditions from 1999-2004.						

Source: Kanab Field Office Grazing Files

As stated above, livestock grazing use within the region has significantly decreased from its peak in the early part of the last century. For the most part, these declines are due to reductions in use to more closely reflect the range's carrying capacity, thereby improving rangeland health. Present levels of demand for forage resources are anticipated to continue. In the short term, active use in the decision area is anticipated to increase because of improving range condition and range recovery from recent drought. In the long term, forage demand is anticipated to continue at current levels.

3.3.3 Recreation

The planning area is divided into three distinct physiographic subdivisions—the Grand Staircase, the Kaiparowits Plateau, and the Southern High Plateaus. The types of recreational opportunities are directly related to the unique characteristics of these subdivisions. Recreation activity occurs in developed and undeveloped areas, in both the front and backcountry.

Management of recreation is guided by BLM regulations and policy, federal and state laws, current and emerging trends in public demand for activities and opportunities, and the physical and natural environment surrounding any given area. The intent of the various laws, policy, and guidelines is to meet public demand for outdoor land-based recreation opportunities, while also preventing or minimizing adverse impacts to the natural and cultural elements of Utah's public lands.

Recreation Visitation

The BLM reports recreation visitation estimates using the Recreation Management Information System (RMIS). RMIS estimates participation in 65 types of recreation activities recorded at BLM sites and areas, based on registrations, permit records, observations, and professional judgment. Visitation is estimated by the number of participants/visitors as well as visitor-days. Visitors are the actual number of

people who take part in a recreational activity. A visitor-day is a common recreation unit of measure used among federal agencies and represents an aggregate of 12 visitor-hours at a single site or area. Table 3-26 lists the RMIS figures for the decision area for fiscal years 2001–2006.

It is important to note that the visitation figures in Table 3-26 are only estimates and do not reflect actual visitation occurring in any given year for specific activities in specific areas. Many areas lack direct visitation monitoring facilities such as traffic counters or visitor registers. Direct monitoring by BLM staff is focused on areas of greater use or conflict. Discrepancies in actual use are also a result of the remote nature of much of the decision area that does not receive frequent monitoring. In addition, many of the popular use areas/trails are not designated and there is currently no way to accurately determine the actual amount of recreational use these areas receive.

Table 3-26. Recreation Visitation

Activity	Oct 1, 00-Sep 30, 01		Oct 1, 01-Sep 30, 02		Oct 1, 02-Sep 30, 03		Oct 1, 03-Sep 30, 04		Oct 1, 04-Sep 30, 05		Oct 1, 05-Sep 30, 06	
	Visitors	Visitor Days	Visitors	Visitor Days	Visitors	Visitor Days	Visitors	Visitor Days	Visitors	Visitor Days	Visitors	Visitor Days
Backpacking	12,027	60,071	30,008	150,021	15,000	75,000	15,711	78,555	12,800	64,000	20,000	100,000
Bicycling – Mountain ¹	500	250	621	312	751	376	844	425	780	390	920	459
Camping	8,882	19,063	9,903	21,798	11,509	25,665	12,360	27,748	11,599	26,040	14,746	31,588
Hiking/Walking/Running	15,782	10,798	34,026	25,900	19,644	13,688	20,720	14,234	24,738	14,344	36,726	22,134
Horseback Riding	2,258	865	2,696	1,048	3,235	1,303	3,468	1,348	3,205	1,243	3,846	1,504
Hunting – Big Game	18,247	23,660	22,256	28,879	27,108	35,278	29,815	38,792	28,044	36,531	32,463	42,243
OHVs (Cars/Trucks/ Sport Utility Vehicles) and All-Terrain Vehicles	37,391	24,264	43,960	27,935	51,800	32,267	56,102	34,604	52,684	32,337	63,380	39,321
Picnicking	832	347	649	270	640	267	659	275	582	243	397	166
Endurance Horse Racing	0	0	0	0	0	0	67	134	0	0	0	0
Snow Play – General	2,260	732	2,720	883	3,300	1,075	3,612	1,178	3,404	1,111	3,966	1,291
Staging/ Comfort Stop	11,802	984	11,834	986	13,019	1,085	14,558	1,213	6,461	538	8,025	669
Viewing – Scenery and Other and Photography	11,020	3,453	13,470	4,335	16,494	5,331	17,982	5,839	22,549	7,842	29,536	10,449
Environmental Education and Nature Study	0	0	0	0	10	80	0	0	3,352	838	5,285	1,321
Vending Services	0	0	138	12	442	37	0	0	0	0	948	79
Total	121,001	144,487	172,281	262,379	162,952	191,452	175,898	204,345	170,198	185,457	220,238	251,224

Notes: 1 – Oct 1, 05 – Sep 30, 06 includes 21 visitors and 9 visitor-days for "Bicycling – Road".

Source: BLM 2006b (RMIS)

During the past several years, participation in some recreational activities has substantially increased. More recreationists participate in OHV riding than in any other form of recreation use, although backpackers spend more visitor-days in the area. Big game hunting also receives comparatively high levels of use, both in the number of participants and the number of visitor-days. Other common recreation activities, either in number of participants or in visitor-days, include hiking, camping, and sightseeing/viewing nature. Most recreation use in the decision area is dispersed (125,948 visitors and 223,454 visitor-days in 2006), although site-specific recreation (e.g., developed campgrounds and trailheads) also receive high levels of use (35,779 visitors and 27,768 visitor-days in 2006). Public lands adjacent to Kanab and other communities throughout the planning area receive regular use from residents. Demand for a variety of recreation opportunities in these areas is high, as evidenced by OHV use in the Hog Canyon area and increasing OHV use of Squaw Trail adjacent to Kanab, and equestrian and OHV use in the areas north of Escalante.

Increased recreation use within the decision area can be largely attributed to the increasing number of visitors to neighboring state and national parks, the GSENM, and other surrounding recreation areas. In addition, increased recreation use can be attributed to population growth in Kane County and nearby areas, particularly St. George, the Wasatch Front, and Las Vegas, Nevada.

The majority of recreation activities within the decision area occur primarily during the spring, summer, and fall. However, a steady increase in winter recreation has been occurring, particularly in the Coral Pink Sand Dunes where tubing by local residents has increased.

OHV use has become one of the fastest growing recreational activities. Consequently, existing management efforts and processes, which were developed to address OHV use levels 20 years ago, are often inadequate. Because of the significance of OHV use, it is addressed in the Transportation section.

There are many areas within and near the decision area that provide unique recreational opportunities and have become high-use recreational destination areas. Coral Pink Sand Dunes State Park, established in 1963, encompasses 3,730 acres. It provides a unique setting for camping, hiking, and OHV use. In 2002, the Utah State Parks and the BLM initiated a partnership to manage Coral Pink Sand Dunes resources and recreational facilities. Both agencies signed a formal agreement intended to ensure that the area's outstanding natural features were adequately protected from the adverse impacts of recreational use and to provide sustainable public recreation opportunities consistent with the management recommendations jointly developed by both entities. The Moquith Mountain area adjacent to the state park receives high levels of recreation use as well. Recreation use in this area includes "spill-over" use from the state park, as well as trail-based and heritage recreation (South Fork Indian Canyon Pictographs) unique to this area. Recreation use in this area has been increasing over the last several years and is anticipated to continue to increase.

The Paria Canyon–Vermilion Cliffs Wilderness Area is a well-known area for primitive recreation opportunities. Recreation in the area includes dispersed use (28,890 visitors and 125,524 visitor-days in 2006) as well as trail and campground use (10,899 visitors and 3,148 visitor-days in 2006). Recreation use in this area has been increasing for several years.

Other parts of the decision area that have been identified as receiving increased recreational use include the Parunuweap Canyon WSA, North Fork Virgin River WSA, and Orderville Canyon WSA. These areas provide opportunities for primitive recreation and access to trails in Zion National Park. It should also be noted that adjacent national parks (Zion and Bryce Canyon) have experienced increased visitation and are now experiencing visitor overflows. Consequently, many of these displaced recreationists are seeking additional recreation and camping opportunities outside these areas and are turning to the nearby public lands to serve their needs.

Recreation Management Areas

Recreation management areas are the BLM's primary means for managing recreational use of the public lands. Public lands are identified either as a Special Recreation Management Area (SRMA) or an Extensive Recreation Management Area (ERMA). SRMAs are areas that require a recreation investment, where more intensive recreation management is needed, and where recreation is a principal management objective. These areas often have high levels of recreation activity or are valuable natural resources. ERMAs constitute all public lands outside of SRMAs and other special designation areas. ERMAs are areas where recreation is nonspecialized, dispersed, and does not require intensive management. Recreation may not be the primary management objective in these areas, and recreational activities are subject to few restrictions. There are no identified SRMAs in the decision area.

Developed Recreation Sites

Developed recreation sites are areas that incorporate visitor use with infrastructure. As defined in the *Utah Standards for Public Land Health Guidelines for Recreation Management*, infrastructure of developed recreation sites includes amenities such as roads, parking areas, and facilities that protect the resource and support the recreation user in his or her pursuit of activities, experiences, and benefits. Visitor use infrastructure is a management tool that can minimize resource impacts, concentrate use, and reduce visitor conflicts. Developed recreation sites help accomplish these goals.

There are two developed campgrounds within the planning area, Ponderosa Grove Campground and Whitehouse Campground. Ponderosa Grove Campground is located along Hancock Road between Highway 89 and Yellowjacket Road, and is adjacent to Moquith Mountain WSA. It has seven individual sites and two group sites with parking available at each site. Facilities include vault restrooms, picnic tables, fire pits, and trash cans. There is no water available. Whitehouse Campground is located about 2 miles by gravel road from Paria Contact Station, off Highway 89, about 45 miles east of Kanab. It is 100 yards from the Paria River and has five individual sites with one common parking area. Facilities include vault restrooms, picnic tables, and grills. There are no trash cans and there is no water available. Although the KFO administers both the Paria Contact Station and Whitehouse Campground, they are actually located within the GSENM. In addition, there are some trailheads throughout the decision area for both motorized and non-motorized trails.

Special Recreation Permitting

As authorized by the Land and Water Conservation Fund Act, there are five types of uses for which special recreation permits (SRP) are required—commercial, competitive, vending, individual or group use in special areas, and organized group activity and event use. SRPs are issued to outfitters, guides, vendors, recreation clubs, and commercial competitive event organizers that provide recreational opportunities or services without using permanent facilities. SRPs are also issued for competitive and organized group events. SRPs may be issued for 10 years or less, with annual renewal. The permits are issued to manage visitor use, protect natural and cultural resources, and accommodate commercial recreational uses. Demand for SRPs has been increasing within the decision area; the BLM issued approximately 20 SRPs in each year from 2004 to 2006 for activities that include big game hunting outfitting, OHV tours and events, outfitter-led recreation in the Paria Canyon–Vermilion Cliffs Wilderness Area, and canyoneering.

The BLM also issues SRPs for noncommercial use in certain special areas where a permit system for individual use would achieve management objectives. This includes the Paria Canyon–Vermilion Cliffs Wilderness Area, river use, and backcountry hiking or camping areas, or any area where it is determined that resources and/or visitors require special management and control measures for their protection. Large

non-commercial group activities outside of developed campgrounds could require an SRP, if necessary to meet planned resource management objectives or resource conditions. If the group or activity does not warrant an SRP, a letter of agreement (less formal approach) is often used (e.g., for Boy Scout groups and Sierra Club campouts). The BLM issues non-commercial recreation use permits (RUP) for individual and/or group use of the decision area's two fee-site developed campgrounds. Table 3-27 identifies the RUPs and SRPs issued by the KFO in Fiscal Years 2001–2005. Ponderosa Grove and White House Campgrounds have been operating at approximately 32 and 60 percent of year-round capacity, respectively (the maximum number of RUPs that theoretically could be used if every site were occupied every night of the year). It is important to note that Ponderosa Campground receives most of its visitation during the late spring to early fall seasons; the different environmental conditions (e.g., elevation and geography) at Whitehouse Campground allow it to receive higher levels of visitation into early spring and late fall. During the remainder of the year, both campgrounds receive lower levels of visitation.

Table 3-27. Kanab Field Office RUPs and Individual SRPs: FY01–05

	FY01	FY02	FY03	FY04	FY05
Ponderosa Grove Campground RUPs ¹	1,300	1,014	1,000	1,030	910
White House Campground RUPs ¹	1,275	1,106	1,233	843	980
Individual SRPs for Day Use in Paria Canyon	3,803	4,716	4,183	4,211	4,066
Individual SRPs for Overnight Use in Paria Canyon ²	779	896	911	853	849
<p>Note:</p> <p>1 – Use is limited spatially to the number of sites available and seasonally to the seasons of high recreation use in the area. Therefore, these figures represent the level of use these sites incur mainly during the recreation season, not the level of recreation demand (number of days at capacity, percent of capacity per day, or number of visitors who were not able to use a site due to full capacity).</p> <p>2 – No more than 20 overnight permits available any given day, so figures do not reflect recreation demand in this area, but the level of recreation use.</p>					

Source: Kanab Field Office Recreation Files

3.3.4 Transportation

Development of the existing transportation system in the decision area has been associated with providing access for resource uses such as mineral development, livestock grazing and management, and recreation. Increased demand for access to public lands, combined with research on the impacts of roads on resources and resource uses, has increased the need for a well-designed and well-managed transportation system. There are no backcountry airstrips in the decision area.

The transportation system includes state, county, and BLM system roads, some of which receive regular maintenance. For portions of the transportation system roads that cross BLM-administered land, various government entities and individuals acquire ROWs from the BLM. Issuance of ROWs is based on access needs and resource considerations. State and county system roads (depending on class of the road) are usually constructed and maintained to higher standards than BLM roads and provide the primary arterial and collector road systems for access to and through BLM lands. These larger roads are not maintained by the BLM.

In addition to arterial and collector routes, there are numerous smaller routes throughout the decision area that connect more remote locations to the larger roads. These routes are used for recreational purposes, access to range improvements, access to mineral development, and access to inholdings not managed by

the BLM. Most of these routes are not paved and approximately 85 percent are unimproved; that is, they have a dirt, gravel, or sand surface. The BLM has ground-truthed the existing routes/ways with global positioning system (GPS), using state and county route data to ensure that all existing routes/ways are included for consideration in the planning process. Based on this inventory, there are 1,505 miles of routes/ways (Map 3-17) within the decision area.

Although most access across public land is accomplished informally as casual use along existing routes, administrative access is made available on a case-by-case basis, usually along specific identified routes. Administrative access is made available for emergency purposes, BLM access to manage resources, and for persons engaged in valid uses such as mining claims, mineral leases, livestock grazing, recreation, and other uses.

Revised Statute 2477

Public concern over management of these non-arterial routes has increased in the past decade. One of the major issues concerning potential ROWs is management responsibility. Revised Statute 2477 (RS-2477), contained in the 1866 Mining Law, was intended to facilitate settlement of the West by granting the ability for counties and states to assert a “right-of-way for the construction of highways over public lands.” Congress repealed RS-2477 when FLPMA was enacted in 1976. Since then, it has been an ongoing issue between the Federal Government, counties, and states as to which routes were developed in the West under the RS-2477 authority and thus are the responsibility of the counties. In 1997, Congress directed the Department of the Interior not to issue any new regulations on RS-2477. The Department of the Interior and the State of Utah signed a MOU in April 2003 that established a process to resolve the issues surrounding the disputed routes. However, subsequent legal challenges and court findings in other cases has provided direction that supersedes the MOU. The U.S. Court of Appeals 10th Circuit findings from *Southern Utah Wilderness Alliance v. Bureau of Land Management* (SUWA v. BLM), 425 F. 3d 735 (September 8, 2005), addressed RS-2477 issues such as determining the validity of RS-2477 claims, determining the scope of RS-2477 ROWs, the use, maintenance, and improvements of ROWs, criteria for the legal definition of a road, and responsibility for the burden of proof in RS-2477 cases. Based on this decision, the Department of the Interior, on March 22, 2007, revised its policies for interpreting and implementing the RS-2477 statute. The new policy applies findings from SUWA v. BLM and directs Department of the Interior bureaus to revise their specific RS-2477 policies. The BLM may make non-binding administrative determinations on RS-2477 ROW assertions for planning and management purposes.

Off-Highway Vehicles

OHVs are used within the area for recreational and non-recreational use. Much of the non-recreational OHV use, or administrative use, involves OHVs driven by local ranchers for administration of their grazing operations. Administrative OHV use occurs in association with permitted uses as described above and is determined on a case-by-case basis. OHV use has become a popular method of recreation in itself, as well a means of transportation while hunting, fishing, or camping.

OHV use has become a significant issue because of the increase in the number of users who participate in this recreation opportunity and because of concerns related to the potential resource degradation that can result from high levels of unmanaged use in sensitive areas. During public scoping, more than 25 percent of all comments received related to transportation and access or OHV use. Over the past 20 years, OHV use has become one of the fastest growing recreation activities in southwest Utah, drawing thousands of visitors each year. Visitors are drawn to these areas to experience the numerous roads and trails available for OHV use, the diverse backcountry opportunities and spectacular scenery that the area provides, and

the challenging OHV opportunities the landscape and terrain provides. This is evident by an increased demand for SRPs for group OHV events over the past 2 to 3 years. This trend is expected to continue.

The number of OHV registrations in Utah has increased significantly over the past several years, as have registrations in Garfield and Kane counties. Local and statewide OHV registrations are shown in Table 3-28. The registration data show why OHV use is perceived as one of the fastest growing activities; more OHVs are being registered and it is reasonable to assume that more are being used. Unfortunately, visitation data on OHV use is particularly difficult to collect because of the dispersed nature of the activities. In addition, the number of registrations may not accurately portray actual OHV use. The actual number of OHV users could be higher based on use of OHVs registered outside the planning area.

Table 3-28. OHV Registrations by County, 1998–2005

County	1998	1999	2000	2001	2002	2003	2004	2005	% Change 1998–2005
Garfield	267	297	359	353	585	569	745	772	189
Kane	306	410	428	499	777	873	1,167	1,088	256
State of Utah	51,686	80,469	91,596	95,569	127,556	124,954	161,350	152,841	196

Source: DNR 2004

When the existing LUPs were completed, the level of OHV use in the decision area did not warrant extensive management restrictions. As a result, much of the area is open to cross-country use, although the majority of use occurs along existing routes, ways, or other areas that are already disturbed. OHV management in some areas no longer adequately addresses the issues that have arisen as a result of increased OHV use, which has resulted in some conflicts. Conflicts between OHV use and livestock grazing, non-motorized recreation, wildlife, and other sensitive values were identified during public scoping. The concern was raised that increased OHV use should be planned for in terms of providing a transportation system with varied opportunities (both motorized and non-motorized). Several federal, state, and county agencies in the region have cooperated in developing trail systems to provide these varied opportunities. The Paiute All-Terrain Vehicle and Great Western Trail Systems located the north and east of the planning area are examples of trail systems that allow for increased OHV use while minimizing impacts. In cooperation with state and federal agencies (including the BLM), the Garfield County Trails group is currently designing a county-wide system of motorized and non-motorized trails to meet local needs and to attract the re-creating public as an economic enhancement for the county. Local OHV clubs have also been working with the BLM to sign and manage OHV use in the Hog Canyon drainage near Kanab. These efforts reflect the demand for OHV opportunities.

Although most of the decision area is currently open to cross-country OHV use (Map 2-12), some locations receive intensive OHV use based on landscape characteristics, accessibility, or support facilities. One such area is Coral Pink Sand Dunes State Park and the adjacent public lands. Intensive use in and around the Coral Pink Sand Dunes has resulted in changes in management over the past 10 years to decrease impacts from OHV use. A travel restriction action, followed by an amendment to the Vermilion MFP, addressed such impacts. Other travel restriction actions were the result of addressing impacts in WSAs and the Hog Canyon area. The Sand Hills area, located just north of Kanab, receives intensive OHV use. Increasing OHV use in this area, which is currently managed as open to cross-country use, has resulted in impacts to resources and in conflicts between public land users.

3.3.5 Lands and Realty

The lands and realty program is a support program to all other resources and resource uses. The goals of the lands and realty program are to manage the public lands to support the goals and objectives of other resource programs, provide for uses of public lands in accordance with applicable laws and regulations while protecting sensitive resources, and improve management of the public lands through land tenure adjustments. The program responds to requests for ROWs, permits, leases, withdrawals, and land tenure adjustments from other programs or outside entities. The frequency of such requests is anticipated to increase as neighboring communities grow and the demand for use of public lands increases. As a result, future management of the lands and realty program will likely become more intense, complex, and costly.

The primary responsibilities of the lands and realty program include land tenure adjustments, withdrawal review, ROWs, and other land use authorizations. The following sections describe the current conditions and status of lands and realty within the decision area.

The planning area is composed of approximately 2,847,200 acres, of which 19 percent (554,000 acres) are BLM-administered public surface lands. Approximately 406,400 acres are privately owned, 185,400 acres are administered by the State of Utah (either as state parks or as school trust lands), and 1,701,400 acres are administered by other federal agencies (Map 1-1 and Table 3-29). The Bankhead-Jones lands are special use lands administered by the U.S. Forest Service (USFS) and that provide for endowment and support of colleges for the benefit of agriculture and the mechanical arts.

Table 3-29. Surface Land Ownership in the Planning Area

Ownership	Acres	Percent of Planning Area
BLM	554,000	19
Private	406,400	14
Utah State Parks	7,600	<1
State of Utah (School Trust)	177,800	6
U.S. Forest Service	1,159,300	41
National Park Service	531,600	19
Bankhead-Jones Lands	10,500	<1
Total	2,847,200	

Source: Kanab Field Office GIS

The BLM administers the leasing of the mineral estate underlying USFS, National Park Service, and Bureau of Reclamation withdrawn lands, although mineral management decisions on these lands are coordinated with the appropriate surface agency. The mineral estate of many of the private land parcels was reserved to the U.S. Government at the time they were patented. In these cases, the mineral estate is administered by the BLM and the surface estate is administered by private landowners.

Land Tenure Adjustments

Land tenure adjustments are often associated with accommodating public and private needs, fulfilling State of Utah entitlements, community expansion, consolidating public land, acquiring and protecting important resources, acquiring access to public lands, or serving a national priority. All land tenure adjustments must be in conformance with applicable LUPs and be subject to valid and existing rights. The BLM uses several authorities to make land tenure adjustments through disposal and acquisition.

Lands can be disposed of through sales, exchanges, state quantity grants, color of title, state In Lieu selections, desert land entries, Carey Act entries, patents under the Recreation and Public Purposes Act (R&PP), or through federal legislation. Public lands have potential for disposal when they are isolated and/or difficult to manage. Disposal actions are usually in response to public request, such as community expansion. Disposals result in a title transfer, wherein the lands leave the public domain. All disposal actions are coordinated with adjoining landowners, local governments, and current land users. Disposal actions require a site-specific environmental analysis in accordance with NEPA (unless the disposal is a result of federal legislation and is exempted from NEPA review). The NEPA analysis may reveal resource conditions that could not be mitigated to the satisfaction of the authorized officer and may therefore preclude disposal. Public sales are managed under the disposal criteria set forth in Section 203 of FLPMA and the Federal Land Transaction Facilitation Act. Public lands determined suitable for sale are offered on the initiative of the BLM unless their disposal was directed by federal legislation. The lands are not sold at less than fair-market value. Specific lands suitable for sale must be identified in the applicable LUP. Any lands to be disposed of through sale that were not identified in the LUP would require a plan amendment before a sale could occur. Lands can also be disposed of as directed by federal legislation. Two examples include the following:

- Legislation was passed in approximately 1986 that included a provision authorizing the sale of public land within the town limits of Kanab City. Approximately 240 acres of public land were sold to Kanab City under this authority.
- In October 1998, President Clinton signed into law the Utah Schools and Land Exchange Act (P.L. 105-335), which resulted in conveyance of more than 47,000 acres of public lands (both surface and mineral estates) within the KFO to the State of Utah.

Disposal actions were considered in previous LUPs. The Vermilion MFP identified approximately 100 acres of public lands that would be made available for potential disposal to satisfy the requirements of the Public Sale Act of 1968. However, the recommendation did not consider other requirements that must be met in adjudicating the applications for disposal. The Cedar-Beaver-Garfield-Antimony RMP provided direction to develop a disposal plan in which approximately 1,000 acres of public land within the decision area would be made available for disposal over the life of the plan. A total of 50,495 acres of public land within the decision area have been disposed of (through exchanges, FLPMA land sales, and R&PP sales) since the existing LUPs were prepared. Future disposal actions are anticipated as lands are identified for consideration for disposal to consolidate public land, facilitate community expansion, and remove from federal jurisdiction land parcels that are isolated or difficult to manage.

Acquisition of lands can be pursued to facilitate various resource management objectives. Acquisitions, including easements, can be completed through exchange, purchase, or donations or receipts from the Federal Land Transaction Facilitations Act sales or exchanges. Land exchanges are initiated in direct response to public demand, or by the BLM to acquire sensitive resources and/or improve management of the public lands. Exchanges are considered on a case-by-case basis where the exchange is in the public interest and where acquisition of the non-federal lands will contain higher resource or public values than the public lands being disposed of. A total of 3,393 acres of private and state land within the decision area have been acquired by the BLM since the existing LUPs were prepared. Future land acquisitions are anticipated as opportunities arise to acquire access to public lands and protect important resources.

Withdrawals

A withdrawal is a formal land designation that withholds an area of federal land from settlement, sale, location, or entry under some or all of the public land laws for the purpose of limiting those activities to maintain public values or to reserve an area for a particular public purpose. Section 204(l) of FLPMA requires the review of existing withdrawals to determine if they are still serving the purposes for which

they were made. If the withdrawals are no longer serving their intended purpose, they are to be revoked and the lands opened or partially opened to the uses that were previously prohibited. If withdrawals are determined to still be meeting the purposes for which they were made, they are recommended for extension for a specific term. If it is determined by a withdrawal review that a withdrawal should be revoked or terminated, or a withdrawal expires, the land does not automatically open to operation of the public land law(s) to which the land was closed. An opening order would be published to notify the public when and to what extent the land would be opened, consistent with planning decisions. An opening order may be incorporated in a public land order or termination order that revokes or terminates a withdrawal or may be published in the *Federal Register* as a separate document. The BLM can make recommendations to designate, revoke, or extend withdrawals, but only the Secretary has the authority to actually take these actions.

A total of 83 current withdrawals exist within the decision area. Table 3-30 shows the type, number, and total acres by withdrawal type.

Table 3-30. Existing Withdrawals within the Decision Area

Withdrawal Type	Number	Acres
Public Water Reserves	80	3,191
Administrative Sites	2	200
Designated Wilderness	1	21,200
Total	83	24,591

Source: Kanab Field Office Lands Records

Rights-of-Way

A total of 202 ROWs exist within the decision area, authorizing construction, operation and maintenance of powerlines, telephone lines and fiber-optic cables, irrigation and culinary water facilities and pipelines, mineral material sites for federal aid highways, communication sites, ditches and canals, pipelines for mineral resources, roads, highways, and other similar uses (Table 3-31). These ROWs have been granted to various towns, cities, counties, individuals, companies, organizations, government agencies, and other entities. Whenever feasible, the BLM encourages joint use and placement of new facilities in existing use areas that have already been disturbed, such as existing communication sites, roads, and highways. Table 3-31 shows the type and number of existing ROWs.

Table 3-31. Existing Rights-of-Way within the Decision Area

ROW Type	Number
Roads	70
Powerlines	59
Communication Uses	10
Telephone Lines	22
Water Facilities ¹	23
Stream Gauging Stations	1
Water Pipelines	12
Oil and Gas Pipelines	1
Misc. ROWs ²	3
Railroads	1
Total	202

¹ Includes reservoirs, diversion structures, sediment basins, storage tanks, and associated ditches, canals, pipelines, and/or access roads.

² Department of Transportation maintenance shed; trails and trailhead; corral.

Source: BLM staff compilation and review of LR2000

Two ROW corridors have been established under previous LUPs with the intent of preventing random proliferation of major industrial transportation and utility systems throughout the planning unit for which they were proposed. The Vermilion and Zion MFPs established a utility corridor that is 33 miles long, ½ mile wide, and covers approximately 9,500 acres of public lands. All types of utility and transportation systems are allowed within this corridor. The Cedar-Beaver-Garfield-Antimony RMP established one corridor (1 mile wide and approximately 8 miles long within the decision area) for power transmission lines. This corridor was analyzed for establishment of power transmission lines and is designated for that purpose. Any use authorization other than for electrical transmission lines will require a separate analysis. One additional utility corridor has also been established by federal legislation. P.L. 105-355 (enacted in 1998) designated a 740-foot utility corridor along U.S. Highway 89; the portion within the decision area extends from the GSENM boundary north to Mount Carmel Junction.

Although established corridors exist, this does not preclude the location of transportation and transmission facilities in other areas if environmental analysis indicates that the facilities are compatible with other resource values and objectives. Further identification of corridors may not necessarily mandate that transportation and transmission facilities would be located there, particularly if they are not compatible with other resource uses, values, and objectives in and near the corridors, or if the corridors are saturated. ROWs are issued with use stipulations and other mitigation measures to minimize impacts to resources.

Communication sites host communication equipment and facilities for various uses, such as television, radio, microwave, seismograph, cellular, and Internet. There are five established communication sites within the decision area, plus one additional site where only administrative (i.e., governmental) use is authorized. Table 3-32 lists these communication sites and their uses.

Table 3-32. Communication Sites within the Decision Area

Site Name	Type of Use	User	Acres
Orderville TV Site	Television and FM translators	Western Kane County Special Service District	1.0

Site Name	Type of Use	User	Acres
	Wireless Internet	Xpressweb	
	Cellular	South Central Utah Telephone	
Orderville South	Microwave	South Central Utah Telephone	1.0
TV Hill	Television and FM Translators	Western Kane County Special Service District	19.7
	2-Way Radio	South Central Utah Telephone	0.1
	Cellular	Western Wireless Corp.	
	2-Way Radio	BLM	10.0
	Wireless Internet	Xpressweb	
Vermilion	Seismograph	University of Utah	0.1
Hatch	Television and FM Translators	Hatch Town Corp.	1.0
Escalante	Cellular	South Central Utah Telephone	0.03

Source: BLM LR2000

Leases, Permits, and Easements

Three different types of leases have been issued within the decision area—R&PP leases, leases issued under Section 302(b) of FLPMA, and airport leases. A total of four R&PP leases exist, authorizing the development and use of a storage facility, shooting range, parking lot, nature park, nature trail, rodeo grounds, mountain park, and campsites. In addition, two other areas have been classified as suitable for lease under the R&PP Act. Two airport leases have been issued—one for the Panguitch Airport and one for the Bryce Canyon Airport.

Permits can be issued under two authorities: FLPMA (Land Use Permits) and Mineral Leasing Act (Temporary Use Permits). Permits authorize short-term uses of public lands that usually involve little or no land improvements, construction, or investment.

BLM policy is to acquire easements to improve access to public lands. The BLM has acquired seven easements for roads and trails under authority of FLPMA.

3.3.6 Minerals and Energy

The BLM minerals management program falls into three categories: leasable minerals, locatable minerals, and salable minerals. Leasable minerals include oil and gas, coal, and geothermal resources. Locatable minerals include uranium-vanadium, antimony, gypsum, and limestone. Salable minerals or mineral materials include sand and gravel, stone, clay, and humate. Some information from the *Mineral Potential Report for the Kanab Planning Area* (BLM 2005d) is included below. More specific information about past and potential development, as well as the reasonably foreseeable development scenario, is contained in the report.

Leasable Minerals

Oil and Gas

Only limited exploration and development for oil and gas has occurred within the planning area. As of 2005, there is only one producing oil field, the Upper Valley field, which was discovered in 1964 (BLM 2005d). Based on the cumulative oil production through 2004, which falls in the range of 25 to 50 million barrels, the field is classified as a medium-sized field. Four CBNG holes were drilled in the planning area

from 2002 through 2004. As of 2005, there are 23 authorized oil and gas leases, comprising 65,535 acres of the planning area (Map 3-18). There are no applications for permit to drill (APD) oil and gas wells within the decision area.

Since the 1960s, approximately 68 oil and gas-related wells have been drilled in the region, 57 of which were drilled on federal mineral estate (Table 3-33). The last well drilled on federal mineral estate was in the 1990s.

Table 3-33. Oil and Gas Wells Drilled in the Kanab Field Office (1960s–2000s)

Decade	Subsurface Ownership		
	Federal	State	Private
1960s	26 (primarily USFS)	1	5
1970s	18 (primarily USFS)	0	2
1980s	10 (primarily USFS)	0	2
1990s	1	0	0
2000s	0	0	4

Source: Sprinkel 1999 (Utah Geologic Survey Digital Geologic Resources Atlas of Utah)

The following five plays have been identified in the planning area:

- Late Proterozoic/Cambrian Play
- Paleozoic Devonian-Pennsylvanian Play
- Permo-Triassic Unconformity Play
- Cretaceous Sandstone Play
- Cretaceous Coal Bed Gas Plays.

The Permo-Triassic Play and the Devonian-Pennsylvanian Play are rated high (H) for development potential, and the Cretaceous Sandstone Play is rated moderate (M) for development potential. The Late Proterozoic/Cambrian Play and Cretaceous Coal Bed Gas Plays are rated low (L) for development potential.

Based on historic drilling rates and development potential, the Utah Geological Survey estimates that a reasonably foreseeable development scenario would be 70 new exploration wells and 20 new development wells during the next 20 years. The reasonably foreseeable development scenario includes the discovery of one new petroleum field. If more fields are discovered, higher levels of drilling and disturbance would likely occur (BLM 2005d).

Coal

Kane County and Garfield County contain 54 percent and 22 percent of Utah's coal resources, respectively. Areas of coal development potential are shown on Map 3-19. The Alton coal field is an area of high development potential for coal. The Cannonville and Skutumpah areas of the Alton coal field and the portions of the Kaiparowits Plateau and Kolob coal fields with thicker coals are rated as having moderate development potential, while all other coal-bearing areas are rated as having low development potential (BLM 2005d).

Coal production in Kane County was about 70,000 short tons through 1971. No coal production has occurred in either county since 1971 (Utah Energy Office 2004). The Escalante, Paria, Zion, and Cedar-

Beaver-Garfield-Antimony MFPs/RMP identified areas unsuitable for coal leasing, based on criteria in 43 CFR 3461.5 and areas identified as unsuitable in a 1980 Secretarial Decision.

There are presently no coal leases within the decision area. In the past, 31 coal leases have been issued, but no mining ever occurred before termination or expiration of the leases. As of November 2006, the BLM has received and is processing a lease to surface mine 40 million tons of coal in the Alton coal field. A site-specific EIS is being developed to analyze the impacts of development of the mine.

Geothermal

No geothermal resources with high or moderate development potential have been identified in the planning area. Areas of low geothermal potential exist near the Sevier fault and near Quaternary volcanic centers. No development of geothermal resources is predicted to occur in the next 15 years. Geothermal development interest could be affected if renewable energy portfolio standards and incentives are legislatively adopted (BLM 2005d).

Locatable Minerals

There is a low development potential for locatables within the decision area. As of fall 2005, there are 14 authorized mining claims in the decision area. Six claims are actively being mined under the authority of 43 CFR 3809, and include one notice of intent and one plan of operations. The operations are small in scale and are associated with alabaster carving stone and septarian concretions (nodules).

Uranium-Vanadium

Little uranium production has come from the planning area. Known deposits are generally small and low grade, and the potential for finding undiscovered large, high-grade deposits is low. The development potential for uranium-vanadium is rated low. Thus, no exploration or development activity is expected in the next 15 years (BLM 2005d).

Antimony

There have been several mining claims and studies performed related to antimony within the planning area. The small size of the identified deposit and the remoteness of the area make future attempts at producing antimony unlikely. The development potential of antimony is rated low. Thus, no antimony exploration or development activity is expected in the next 15 years (BLM 2005d).

Gypsum

Only small-scale mining and minor prospecting for gypsum has occurred (BLM 2005d). The development potential of large-scale bulk gypsum operations is rated as low (Map 3-20). Thus, only small-scale gypsum exploration and development activity is expected in the next 15 years (BLM 2005d). There are a number of claims in Dry Valley being worked to extract sculpture-quality alabaster (gypsum). Location and development of small alabaster mines is expected to continue at current levels.

Limestone

There has been little mining of limestone in the planning area, and only minor prospecting for limestone has occurred. The development potential for limestone deposits is rated moderate because the existing deposits lack good resource definition and there are better-defined deposits closer to the major Utah markets. No limestone exploration or development activities are expected in the planning area in the next 15 years (BLM 2005d).

Septarians

Active mining for septarian nodules is occurring on BLM mining claims and State of Utah gemstone leases in the Mt. Carmel area. Development potential is rated high at mine prospects and moderate in other areas where concretion-bearing Tropic Shale is present. Increasing exploration and development activity is expected.

Salable Minerals

At the time of preparation of this plan, there are 16 BLM mineral material pits authorized within the decision area; 12 of the pits are available to the public and 4 available only for Federal Highway Administration use. On average, 30–50 over-the-counter mineral permits are issued annually.

Sand and Gravel

Sand and gravel historically have been some of the most significant mineral commodities mined from the planning area (Doelling et al. 1989). The single greatest use has been for highway construction (Doelling 1975, Doelling et al. 1989), and most past mining has been near existing roads. With the creation of the GSENM in 1996, future sand and gravel production from Garfield and Kane counties will be focused even more on the planning area because mineral material disposals are no longer authorized in the GSENM.

The development potential for sand and gravel deposits in the planning area is rated high in areas of past or present sand and gravel extraction, as well as at sites where the proper host formations are found within 3 miles of a paved road (Map 3-21). Sand and gravel development potential is moderate where the host formations are more than 3 miles from a paved road, and low where the host formations are administratively restricted from future development. Continued exploration and development activities for sand and gravel are expected in the planning area in the next 15 years at a level that increases slightly from past rates. Most of the activity would be in the areas of high development potential, but some would also occur farther from paved roads to allow maintenance of unpaved county roads (BLM 2005d).

Stone

Early settlers in the planning area used fieldstone and quarry stone mostly for home and building construction. A small number of building/dimension stone quarries remain active and there are several that are inactive or abandoned. In addition, there are a small number of decorative stone quarries, as well as quarries for rip-rap. The development potential for stone is rated high at past and present quarry sites and moderate outside these areas where the host formations occur (Map 3-22). Stone exploration or development activity is expected to continue during the next 15 years at rates slightly higher than historic activity levels (BLM 2005d).

Clay

Several small mines are known to have produced clay from the Garfield County portion of the planning area (Doelling 1975). The development potential for clay is rated high at past and present extraction sites and moderate outside these areas where the host formations are present (Map 3-22). No clay exploration or development activity is expected during the next 15 years (BLM 2005d).

Humate

No known exploration or development activities for humate have occurred in the planning area. The development potential for humate is rated low. No humate exploration or development activity is expected during the next 15 years (BLM 2005d).

Renewable Energy Resources

As part of the BLM's proposed *National Energy Policy Implementation Plan*, the BLM and the Department of Energy's National Renewable Energy Laboratory conducted an assessment of renewable energy resources on BLM lands in the western United States. The results of the assessment were published in a recent report, *Assessing the Potential for Renewable Energy on Public Lands, 2003*. The BLM/National Renewable Energy Laboratory team used GIS data to assess the potential for concentrating solar power (CSP), photovoltaics, wind, biomass resources, and geothermal energy on public lands. The team used several GIS data screening criteria to consider factors that would impact the economic and technical feasibility of renewable power production. This would help to determine the true potential of an area to produce renewable energy. Screening criteria used in the assessment included access to roads and transmission facilities, available land surface, site condition, land use restrictions, distance to population centers, government policies, and regional market conditions. The primary goal of the assessment was to identify BLM planning units in the western United States with the highest potential for development of renewable energy.

The results of the assessment indicate that the decision area is not considered an area of overall high potential for development of renewable energy, although it is identified as having some potential for renewable resources. The raw potential for solar, wind, and biomass energy are quite high in some portions of the decision area; however, the potential for development of these resources declines considerably when the data screens are applied. This indicates that the energy resources are present, but various factors would reduce the concentration, production, and transmission of this energy. There are no renewable energy facilities currently present.

The potential for direct solar power is considered high throughout the decision area (5 to 6 kilowatt hours per square meter per day), with particularly high concentrations in the eastern portion (7 kilowatt hours per square meter per day). This potential is limited to relatively small areas in the southwestern and northwestern portions of the decision area (with a CSP of 5 to 6 kilowatt hours per square meter per day) when the data screens are applied. The same is true for concentration of photovoltaics, which is directly related to CSP. Wind energy as high as Power Class 6 is present in the northern and northwestern portions of the decision area, but this potential area is reduced to only the northwestern corner (with Power Class rankings of 4 to 6) when the data screens are applied. However, this small area of high wind energy could be a high potential production area. The decision area appears to have potential for biomass energy production in the northern and west-central portions, and this potential is relatively unaffected when the data screens are applied. This area was not identified as an area with any measurable potential for geothermal energy production. Although the decision area was not identified as an area with overall high potential for renewable energy production, the results of the assessment show that the area does have some potential to produce such energy, which could increase in importance as the demand for renewable energy increases.

3.4 SPECIAL DESIGNATIONS

Special designation areas are designated to protect or preserve their unique values or uses. These areas therefore require management different from that applied to the surrounding public lands. This section

identifies the various special management areas within the decision area and addresses the qualities or uses that have resulted in their designation. The types of special designation include areas of critical environmental concern (ACEC), Wilderness, WSAs, Wild and Scenic Rivers (WSRs), and Scenic Byways.

3.4.1 Areas of Critical Environmental Concern

ACECs are defined in FLPMA, Section 103(a) as “areas within the public lands where special management attention is required (when such areas are developed or used or where no development is required) to protect and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources or other natural systems or processes, or to protect life and safety from natural hazards.” The BLM prepared regulations for implementing the ACEC provisions of FLPMA. These regulations are found at 43 CFR 1610.7-2. The BLM also developed policy on ACECs that can be found in 45 FR 57318 and BLM Manual 1613. An ACEC’s management is determined at the time of its designation and serves to protect and manage the relevant and importance (R&I) values, resources, processes, systems, or hazards (collectively values). ACECs are also protected by the provisions of 43 CFR 3809.1-4(b)(3), which require an approved plan of operations for activities under the mining laws except for casual use.

Established in 1986, there is one existing ACEC, the 220-acre Water Canyon/South Fork Indian Canyon ACEC, in the southwest corner of the decision area (Map 2-37). Although the ACEC is considered a single ACEC, it is divided into two separated portions. The 50-acre South Fork Indian Canyon is the northern portion of the ACEC; the 170-acre Water Canyon is the southern portion. The R&I values for which the ACEC was designated include relict desert riparian vegetation, wildlife, and scenic values.

Five nominated ACECs were determined to meet the relevance and importance criteria and are considered potential ACECs in this planning process (Map 2-39). The potential size of each area and the associated relevant and important values are listed in Table 3-34. It should be noted that the Cottonwood Canyon potential ACEC acres include the acreage of the existing Water Canyon/South Fork Indian Canyon ACEC. The *ACEC Evaluation Report* (Appendix H) contains more information on the potential ACECs and the associated R&I values, threats, and potential management.

Table 3-34. Potential Areas of Critical Environmental Concern

Potential ACEC	Acres with Relevant and Important Values	Relevant and Important Values
Cottonwood Canyon	3,800	Scenic, Cultural, Wildlife, Natural Processes
Welsh’s Milkweed	1,300	Scenic, Geology (Sand Dunes), Coral Pink Sand Dunes Tiger Beetle, Welsh’s Milkweed
Vermilion Cliffs	23,400	Scenic, Cultural, Wildlife, Natural Processes
White Cliffs	26,000	Scenic, Cultural, Wildlife, Natural Processes
Parunuweap Canyon	6,100	Scenic, Cultural, Wildlife
TOTAL ACRES	60,600	

Source: Kanab BLM

3.4.2 Wild and Scenic Rivers

The National Wild and Scenic River System (NWSRS) was created by the Wild and Scenic Rivers Act of 1968. The purpose of the act was to preserve in their free-flowing condition certain selected rivers of the

nation, which, with their immediate environments, have outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values. Section 5(d)(1) of the act directs federal agencies to consider the potential for national wild, scenic, and recreational river areas in all planning for the use and development of water and related land resources. The wild and scenic river (WSR) review process is incorporated into the planning process for the Kanab RMP and includes the evaluation of a river's eligibility, tentative classification, and suitability for congressional designation into the national system of rivers (Appendix G).

Eligibility and tentative classification consist of an inventory of existing conditions. Eligibility is an evaluation of whether a river or river segment is free-flowing and has one or more outstandingly remarkable values (ORV). If found eligible, a river is analyzed as to its current level of development (e.g., water resources projects, shoreline development, and accessibility) and segmented accordingly. Each river segment is given one of three tentative classifications—"wild," "scenic," or "recreational"—based on the degree of development. The final procedural step, suitability, provides the basis for determining whether to recommend a river as part of the national system by considering such factors as manageability, current uses, and other management options. Fifteen river segments have been determined eligible for designation into the national system of rivers (Map 2-40). Table 3-35 identifies these segments, their ORVs, the acres associated with the river corridor, and the percent of the river corridor in the decision area.

Table 3-35. Rivers Determined Eligible for Designation into the National Wild and Scenic Rivers System

Segment Name	Outstandingly Remarkable Value(s)	Miles in Decision Area	Corridor in Planning Area (acres)	Corridor in Decision Area (acres)	% of Corridor in Decision Area
North Fork Virgin River	Scenic, Recreational, Wildlife	2.2	500	430	86
East Fork Virgin River (three segments)	Scenic, Cultural, Recreational, Fish, Wildlife, Historical, Ecologic	13.5	2,510	2,510	100
Orderville Gulch (Esplin Gulch)	Scenic, Recreational, Wildlife, Ecologic	3.2	640	590	92
Meadow Creek/Mineral Gulch	Scenic, Recreational	9.2	1,780	1,760	99
Deep Creek	Scenic	0.7	210	130	62
Cottonwood Creek	Recreational, Cultural, Wildlife	1.1	320	280	87
Indian Canyon	Scenic, Recreational, Ecologic	0.7	160	140	88
South Fork Indian Canyon	Scenic, Recreational, Ecologic	1.8	490	450	92
North Branch of South Fork Indian Canyon	Scenic, Recreational, Cultural, Ecologic	0.4	110	90	82
Water Canyon	Scenic, Recreational, Ecologic	3.2	710	710	100
Hell Dive Canyon	Scenic, Recreational, Cultural, Ecologic	1.4	350	350	100
Paria River	Scenic, Wildlife, Recreational	4.8	1,090	1,020	100

Segment Name	Outstandingly Remarkable Value(s)	Miles in Decision Area	Corridor in Planning Area (acres)	Corridor in Decision Area (acres)	% of Corridor in Decision Area
Three Mile Creek	Fish	3.7	850	770	91
Totals		45.9	9,720	9,230	95

The segment of the Paria River in Utah was found to be eligible in the *Final Arizona Statewide Wild and Scenic Rivers Legislative Environmental Impact Statement, December 1994*. This is the portion of the Paria River located within the Paria Canyon–Vermilion Cliffs Wilderness.

Appendix G contains a description of the WSR review process, as well as an evaluation of each eligible river segment. No river segments within the decision area have been designated into the National Wild and Scenic River System (NWSRS) by Congress.

3.4.3 Wilderness

The Wilderness Act of 1964 established the National Wilderness Preservation System for the purpose of preserving a representative sample of ecosystems in a natural condition for the benefit of future generations. With the passage of FLPMA in 1976, Congress directed the BLM to inventory, study, and recommend which public lands under its administration should be designated wilderness. The FLPMA-mandated wilderness review process was completed in Utah in October 1991.

The Paria Canyon–Vermilion Cliffs Wilderness was designated by Congress on August 28, 1984 as part of the Arizona Wilderness Act of 1984. The 111,600-acre wilderness area is in the southeast portion of the decision area at the Arizona and Utah state lines, with portions of the wilderness area located in each state (Map 3-23). The 21,200 acres in Utah are managed by the KFO. There are 90,400 acres in Arizona, which are managed by the Arizona Strip Field Office. The designating legislation closed the wilderness area to all forms of appropriation under the United States mining laws and all laws pertaining to mineral leases to reflect Arizona Wilderness Act of 1984.

3.4.4 Wilderness Study Areas

The Wilderness Act of 1964 established a national system of lands for the purpose of preserving a representative sample of ecosystems in a natural condition for the benefit of future generations. Until 1976, lands considered for, and designated as, wilderness were managed by the National Park Service, the USFS, and the USFWS. With the passage of FLPMA in 1976, Congress directed the BLM to inventory, study, and recommend which public lands under its administration should be designated wilderness. The BLM's wilderness review process was carried out in the three steps described in the following paragraph.

The first step, inventorying public lands to determine which lands had wilderness characteristics, was done with extensive public involvement. Lands found to have wilderness characteristics were administratively designated as WSAs. The second step involved studying the WSAs to determine their suitability for wilderness designation. In Utah, that study included the preparation of a statewide wilderness EIS. The *Utah Statewide Wilderness Study Report*, published October 1991, reported the results of the study and made recommendations to Congress through the President about which areas should be designated wilderness, which is the third step. The final recommendation for wilderness designation was forwarded to Congress June 22, 1992. Congress has not yet acted on that recommendation. This completed the FLPMA-mandated wilderness review process.

From the recommendations in the *Utah Statewide Wilderness Study Report*, five WSAs were identified in the decision area. A discussion of the current wilderness characteristics and other resource values and uses in each WSA can be found in the Wilderness Study Report (BLM 1991b). These five WSAs account for approximately 53,900 acres (10 percent) of the decision area (Map 3-23 and Table 3-36).

Table 3-36. Wilderness Study Areas

Proposal Name	Area (in acres) ¹
North Fork Virgin River	1,050
Orderville Canyon	1,950
Parunuweap Canyon	30,800
Canaan Mountain	4,300 ²
Moquith Mountain	15,200
Acquired Lands Managed as WSA	600
Total	53,900
Notes: 1) Acres differ from those identified in the <i>Utah Statewide Wilderness Study Report</i> due to the use of GIS-generated figures. 2) Includes acres only in decision area.	

Source: BLM 1991a

The five WSAs, established under the authority of Section 603(c) of FLPMA, are being managed to preserve their wilderness values according to the *BLM Interim Management Policy for Lands Under Wilderness Review (IMP)*, and will continue to be managed in that manner until Congress either designates them as wilderness or releases them for other uses.

Management of WSAs is similar to, but generally less restrictive than, management of designated wilderness areas. The Federal Onshore Oil and Gas Leasing Reform Act of 1987 closed lands within BLM wilderness study areas to oil, gas, or geothermal leasing (30 U.S.C. 226-3(a)(2)). Some of the many activities that are allowed in WSAs include hunting, fishing, travel with motorized vehicles on inventoried ways (unless otherwise restricted through land use planning), camping, hiking, horseback riding, and livestock grazing.

Motorized travel in the WSAs has been a controversial issue and a management concern. Unauthorized cross-country OHV activity as well as unauthorized use of closed routes remains a concern. There are 32 miles of inventoried ways in the Parunuweap Canyon (23 miles) WSA and the Moquith Mountain (9 miles) WSA that were included in the 1993 Wilderness Inventory EIS. Due to the remote nature and lack of inventoried ways, OHV impacts in the Orderville Canyon WSA and the North Fork Virgin River WSA are limited. There are no ways in the Canaan Mountain WSA; however, there are several adjacent or cherry-stemmed routes. There can be periodic disturbances associated with OHV use adjacent to these areas that are accessed by inventoried ways.

In isolated areas of the Parunuweap Canyon, Moquith Mountain, and Canaan Mountain WSAs, OHV use is increasing and some impacts are occurring to riparian vegetation and other resources. Some OHV use is occurring off existing inventoried ways in these WSAs. If OHV use off inventoried ways continues to increase at the current rate observed, impairment to these WSAs could result. If OHV drivers do not comply with the OHV travel limitations in any of the WSAs and future impacts result that could impair wilderness values, the BLM will implement additional management actions, which could include additional OHV travel restrictions or closure to OHV use.

The Utah West Desert Land Exchange Act of 2000 (West Desert Act) ratified the “Agreement for Exchange of Lands, West Desert State-Federal Land Consolidation” between the Secretary of the Interior and the Governor of Utah. Section 6 of that agreement states “...if any portion of the transferred lands are wholly or partially encompassed within a wilderness study area created pursuant to Section 603 of FLPMA...then those lands shall be administered, subject to valid existing rights, pursuant to applicable statutes and regulations governing wilderness study areas....” One section of land within the planning area, adjacent to the Canaan Mountain WSA, was included in the land exchange (Map 3-23). Thus, pursuant to the West Desert Act, this area is managed in accordance with all laws and regulations applicable to WSA management (IMP), but is not included in the WSA acreage totals. In addition, guidance from RMP decisions specific to the Canaan Mountain WSA, including OHV designations, apply to this area.

Only Congress can designate the WSAs established under Section 603 of FLPMA as wilderness or release them for other uses. The current status of WSAs will not change in the Kanab RMP process; however, an understanding of the WSAs and the reasoning for their designation will provide insight into current management procedures and issues that must be addressed during the RMP process. The following is a brief description of each WSA gathered from the *Utah Statewide Wilderness Study Report*.

North Fork Virgin River WSA (1,050 acres)

The North Fork Virgin River WSA is located in western Kane County along the eastern boundary of Zion National Park, approximately 45 miles northwest of Kanab. The area is roughly 2 miles long from north to south and 1 mile wide east to west (Map 3-23). The WSA consists entirely of BLM-administered public land and does not include any state, private, or split-estate inholdings. The WSA is bordered by state and private land except on the southwest where it adjoins Zion National Park.

The WSA is located in the Grand Staircase physiographic province at the southern end of the High Plateaus section of the Colorado Plateau physiographic province. Elevations within the WSA range from approximately 5,400 feet on the canyon floor to 6,900 feet in the northern part of the WSA. The North Fork of the Virgin River flows westward through a canyon in the southern part of the WSA. The segment of the Virgin River within the WSA is 1.5 miles long. Most of the area is covered by mountain shrub vegetation consisting of pinyon, juniper, scrub oak, and other kinds of brush and bunchgrasses. The remainder of the WSA is dominated by pinyon-juniper woodland with brush, forbs, and some ponderosa pine.

The WSA is essentially natural, and largely appears as an untouched bench cut by a deep canyon system with outstanding scenic values equal to those of Zion National Park. The canyon floor provides outstanding opportunities for solitude. Screening by vegetation and terrain is excellent because the canyon floor is well below the upper bench lands. The canyon is sinuous, and thick vegetation covers parts of the canyon floor. The remaining portion of the WSA slopes gently southward and provides little topographic screening.

Orderville Canyon WSA (1,950 acres)

The Orderville Canyon WSA is in western Kane County along the eastern boundary of Zion National Park, about 40 miles northwest of Kanab (Map 3-23). The WSA consists entirely of BLM-administered public land. The WSA does not include any state, private, or split-estate inholdings. The WSA is bordered by private land on the east. On the north and south, the boundary generally excludes the old logging area and logging trails found at the edges of the upper canyon rims. The western boundary of the WSA is contiguous with the boundary of Zion National Park for about 1.5 miles.

The WSA is located in the Grand Staircase physiographic province at the southern end of the High Plateaus section of the Colorado Plateau physiographic province. The topography of the WSA is rugged, with elevations ranging from about 5,100 feet on the canyon floor to 6,600 feet at the southwest edge of the WSA. The WSA contains a 2-mile segment of the upper Orderville Canyon (Orderville Gulch) and its several tributary canyons. Most of the area is covered by pinyon-juniper woodland with a sparse understory of brush, forbs, and grasses. The remainder of the WSA is dominated by mountain shrub.

The WSA is in a natural condition and is an untouched deep canyon system with outstanding scenic values reminiscent of neighboring Zion National Park. The opportunity to experience outstanding solitude exists in the deeply entrenched, 1,167-acre Orderville Canyon. Some of the side canyons are narrow and moderately vegetated with oak brush, ponderosa pine, pinyon, and juniper, providing both topographic and vegetative screening, resulting in outstanding opportunities for solitude. The upper bench area does not offer comparable opportunities.

Parunuweap Canyon WSA (30,800 acres)

The Parunuweap Canyon WSA is located in western Kane County, about 25 miles northwest of Kanab. The WSA is an irregularly shaped unit, roughly 10 miles at the maximum from north to south and 10 miles from east to west. The study area includes 30,800 acres of BLM-administered public land (Map 3-23). There are two inholdings (2 separate sections, totaling 1,253 acres) within the WSA boundary. No private or split-estate lands are within the WSA. The western boundary of the WSA is contiguous with Zion National Park for approximately 4.8 miles. The northern boundary is partly along fields, chainings, and topographic contours, and partly along the periphery of state and private lands. The southern boundary generally follows roads.

The WSA is characterized by the main, east-west-oriented Parunuweap Canyon and other steep tributary canyons that are surrounded by buttes and mesas. The southwestern part of the WSA is a relatively flat area. Elevations range from about 4,800 feet in the bottom of the East Fork of the Virgin River Canyon to 6,600 feet on Harris Mountain at the southern end of the WSA. Vegetation is almost entirely pinyon-juniper woodland with a sparse understory of shrubs, and a few scattered stands of ponderosa pine.

Opportunities for solitude vary considerably throughout the WSA; however, the deeper, more irregular canyons and areas of eroded sandstone offer the best opportunities. In addition, small areas with sand dunes and the more densely vegetated parts of the WSA also provide opportunities for seclusion and solitude. Opportunities for primitive and unconfined recreation occur in portions of the WSA, including backpacking, rock climbing, photography, and sightseeing.

Canaan Mountain WSA (4,300 acres)

The Canaan Mountain WSA is located in southeastern Washington County and southwestern Kane County, about 70 miles east of St. George, Utah. Of the 47,170 acres of the WSA, approximately 42,870 acres are in Washington County, and 4,300 are in Kane County. The WSA is 10 miles from north to south, and 10 miles from east to west (Map 3-23). The WSA borders the BLM Cottonwood Point Wilderness in northwestern Arizona for about 5 miles along the Arizona state line, and adjoins Zion National Park on the WSA's northeast boundary for about 4 miles. The WSA consists of 47,170 acres of BLM-administered land. There is no private land in the WSA. The WSA is bordered by public (BLM), state, NPS, and private lands, and a road along part of the eastern boundary.

Canaan Mountain is the largest undisturbed plateau top or tableland remaining in southwestern Utah. It has a quality of remoteness and naturalness not found elsewhere in the immediate region. The WSA is in the Vermilion Cliffs portion of the Grand Staircase, at the southern edge of the High Plateaus section of

the Colorado Plateau physiographic province. Canaan Mountain, a sheer plateau that rises 2,000 feet above surrounding land to an elevation of 7,340 feet, is the dominant feature of the WSA. Also found within the WSA are shallow lakes, springs, and 4 miles of perennial streams. Most of the surface of the WSA is rock and bare soil; vegetation covers only about 20 percent of the WSA. Ponderosa pine-mountain shrub is the dominant vegetative type, occupying about 75 percent of the vegetated portion of the WSA. Pinyon-juniper woodland covers approximately 19 percent, and sagebrush and riparian plants occupy the remainder of the vegetated portion of the study area.

Moquith Mountain WSA (15,200 acres)

The Moquith Mountain WSA is located in southwestern Kane County just north of the Arizona state line and about 4 miles west of Kanab. No split-estate lands (federal surface, non-federal mineral) are in the WSA. The Coral Pink Sand Dunes State Park borders most of the WSA on the west. The Kaibab Indian Reservation in Arizona borders the WSA for 5.25 miles on the south, and roads and non-federal lands border the unit on the north and east.

Five distinct landforms comprise the WSA. In the central part are the Vermilion Cliffs, a “step” in the Grand Staircase in the southern end of the High Plateaus of the Utah section of the Colorado Plateau physiographic province. The north side of the Vermilion Cliffs terrace includes a portion of the Coral Pink Sand Dunes and an escarpment above the dunes. The upper part of the WSA is a rocky tableland covered with pinyon-juniper woodlands. Elevations range from 5,000 feet in the southeast at the foot of the cliffs to 7,000 feet on the top of Moquith Mountain in the southwest corner of the WSA.

In general the southern portion and parts of the eastern segment of the WSA provide the greatest opportunity for solitude. There are several short steep canyons in the cliffs on the western side of Moquith Mountain and there is the summit of Moquith Mountain where isolation, sandstone outcroppings, and ponderosa pine provide screening and opportunities for solitude. Opportunities for primitive and unconfined recreation exist within the WSA, including hiking, backpacking, horseback riding, hunting, photography, and sightseeing. The WSA includes such features as perennial streams, hanging gardens, isolated stands of ponderosa pine and aspen, large alcoves, shifting sand dunes, and prehistoric sites.

3.4.5 Other Designations

Designation and management of scenic byways can occur at local, state, or national levels. Because of the number of visitors to state and national parks and monuments, the use of these roadways has resulted in issues that public land management can address. The following is a description of the seven byways that are either entirely or partially included within the decision area (Map 3-24).

National Trails

National Historic Trails are “extended trails which follow as closely as possible and practicable the original route or routes of travel of national historical significance” (NPS 2001a). The purpose of the National Historic Trails is “the identification and protection of the historic route and its historic remnants and artifacts for public use and enjoyment” (NPS 2001a).

The Old Spanish National Historic Trail, designated December 4, 2002, by the Old Spanish Trail Recognition Act of 2002, is a 2,700-mile trade route extending from Santa Fe, New Mexico, to Los Angeles, California, passing through the states of Colorado, Utah, Arizona, and Nevada. The trail splits into two routes before entering Utah, and continues through the State of Utah within the planning area (Map 3-24). The trail corridor is defined topographically based on local land features because no actual trail tread or associated sites have been identified within the decision area.

The Armijo Route enters Utah north of Page, Arizona, in an area that is now part of Glen Canyon NRA, and crosses the Colorado River at the Crossing of the Fathers. The Armijo Route re-enters Arizona along Kanab Creek near Fredonia, Arizona. The route then re-enters Utah just west of Colorado City, heading to the Virgin River where it continues southwest into Arizona.

The Northern Route of the Old Spanish National Historic Trail enters Utah near Moab, splits into two sections at Fremont Junction, and rejoins near the town of Circleville just north of the planning area. From there the Northern Route continues southwest along the Sevier River and U.S. Highway 89, through the Markagunt Plateau along SR 20 in the decision area, and into the Parowan Valley, where it heads southwest out of Utah to rejoin the Armijo Route south of St. George, Utah.

National Scenic Byways

The National Scenic Byways (NSB) Program was established under the Intermodal Surface Transportation Efficiency Act of 1991, and reauthorized in 1998 under the Transportation Equity Act for the 21st Century. Under the program, the U.S. Secretary of Transportation recognizes certain roads as National Scenic Byways or All-American Roads based on their archaeological, cultural, historic, natural, recreational, and scenic qualities. All-American Roads must exhibit multiple intrinsic qualities. For a highway to be considered for inclusion within the NSB Program, it must provide safe passage for passenger cars year-round, it must be designated a State Scenic Byway, and it must have a current corridor management plan in place. Installation of offsite outdoor advertising (e.g., billboards) is not allowed along byways. There is one All-American Road (SR 12); Garfield County has mobilized the effort to nominate Brian Head/Panguitch Lake Byway as a National Scenic Byway.

All American Road – Scenic Byway 12 (State Route 12)

This 180-mile scenic byway was recently awarded the prestigious designation of All-American Highway, the highest designation for any U.S. road. SR 12 is 1 of only 20 All-American Highways in the entire nation. From US Highway 89 south of Panguitch, SR 12 winds east through some of the most varied scenery in Utah. Beginning in Red Canyon, SR 12 winds through the northern portion of Bryce Canyon National Park and the Dixie National Forest, past Kodachrome Basin State Park, through the GSENM and its Escalante Canyons, crosses over aspen-covered Boulder Mountain, and ends up in Torrey, just 5 miles west of Capitol Reef National Park. Throughout its length, SR 12 intersects the decision area several times. In addition, the byway's scenic viewshed includes portions of the decision area away from the constructed road.

Utah Scenic Byways

Similar to National Scenic Byways, Utah State Scenic Byways are highways that have been designated by official state declaration for their scenic, historic, recreational, cultural, archaeological, or natural qualities. The byways are paved roads that are generally safe year-round for passenger cars. Installation of offsite outdoor advertising (e.g., billboards) is not allowed along byways. There are four Utah Scenic Byways within the planning area.

Zion Park Byway (State Route 9)

The 54-mile Zion Park Byway (SR 9) byway extends east from I-15 to meet US Highway 89 at Mount Carmel Junction. Between these two points, the byway passes through the valley of the Virgin River and winds through Zion National Park. The byway enters the decision area at the eastern boundary of the park, where it drops down to Long Valley and the intersection with US Highway 89 at Mt. Carmel Junction.

Markagunt High Plateau Byway (State Route 14 from Cedar City to US Highway 89)

The Markagunt High Plateau Byway (SR 14) is one of the most traveled areas in southern Utah. Accessed off I-15 at Cedar City, this 40-mile byway ascends through a narrow canyon, passes Cedar Breaks National Monument, the Ashdown Gorge, and the Zion Overlook. From the summit, the byway continues into Dixie National Forest to Cedar Mountain and several points of interest, including Navajo Lake. The Markagunt Scenic Byway is known for its cultural, historical, natural, recreational, and scenic attractions. Although the byway never crosses the decision area, the area is within the byway's viewshed.

Brian Head/Panguitch Lake Byway (State Route 143)

The 55-mile Brian Head/Panguitch Lake Byway (SR 143) extends from Parowan to Panguitch. Ascending to an elevation of 10,000 feet through Parowan Canyon, the route travels past Brian Head Resort and Cedar Breaks National Monument. From the Dixie National Forest the byway enters the decision area southwest of Panguitch. This byway is currently working toward NSB designation.

Kanab/Mt. Carmel Byway (US Highway 89)

From Kanab, the Kanab/Mt. Carmel Byway follows US Highway 89 north through Three Lakes Canyon to its junction with SR 12. The road ascends through the Grand Staircase's White, Pink, and Vermilion Cliffs, providing access to Coral Pink Sand Dunes State Park and scenic views of Zion National Park. On the northern stretches of the route, the road crosses a forested mountain valley. Red Canyon's pink cliffs and formations are visible on both sides of the road. The 60-mile route ends in the Dixie National Forest's Red Canyon. US Highway 89 travels through much of the decision area. The byway's scenic viewshed includes portions of the decision area away from the constructed road.

Utah Scenic Backways

State Scenic Backways are roads that do not generally meet federal safety standards for safe year-round travel by passenger cars and have been designated by official state declaration for their scenic, historic, and recreational qualities. Utah Scenic Backways often require use of four-wheel drive, and road conditions vary with factors such as season and weather. There are two Utah Scenic Backways within the decision area.

Johnson Canyon/Alton Amphitheater

The 32-mile Johnson Canyon/Alton Amphitheater Scenic Backway is in south-central Utah. It begins 9 miles east of Kanab on US Highway 89 and heads north where it rejoins US Highway 89 at Glendale. An alternate route extends north to Alton, 9 miles north of Glendale. The backway travels through much of the eastern part of the decision area, forming a portion of the boundary with the GSENM.

Ponderosa/Coral Pink Sand Dunes

Ponderosa/Coral Pink Sand Dunes Scenic Backway provides a 12-mile scenic drive in southwest Utah. It begins at the junction of Hancock Road with US Highway 89 about 7 miles north of Kanab. The backway heads south through the decision area, connecting with Yellowjacket Road and continuing south to Coral Pink Sand Dunes State Park.

BLM Back Country Byways

The Back Country Byway Program was developed by the BLM to complement the National Scenic Byway Program. These byways highlight the spectacular nature of the western landscapes. Back Country

Byways vary from narrow, graded roads that are passable only during a few months of the year to two-lane paved highways with year-round access. There are no BLM backcountry byways or backways in the decision area.

3.5 SOCIAL AND ECONOMIC FEATURES

The following sections include discussions of socioeconomic conditions, Native American religious concerns, and hazardous materials and public safety. The discussion of socioeconomic conditions includes a short summary of the *Socioeconomic Baseline Report* (BLM 2005b). Native American religious concerns are discussed in detail and include information on tribal interests in the planning area, noting features not described in the cultural resources section, such as treaty-based subsistence uses, traditional use areas, and rights of access. Hazardous materials and public safety are addressed by identifying hazardous materials or hazardous waste disposal facilities.

3.5.1 Socioeconomic Conditions

Much of the socioeconomic data available for this study is available only at the county level; therefore, the socioeconomic study area is defined as all of Garfield and Kane counties. When the data or information presented are specifically for the planning area, this is noted. Map 3-25 shows the boundaries of the socioeconomic study area and the planning area, as well as key features such as land ownership and local communities. More detail on socioeconomics, in addition to the information in this section, is provided in the *Socioeconomic Baseline Report*. Garfield and Kane counties share prehistory, settlement patterns, history, culture, and economics. The first non-Indian historic communities in the socioeconomic study were Kanab and Panguitch, which were settled in the mid 1860s by Mormon pioneers, then abandoned, and resettled in the early 1870s. A few years after Panguitch was resettled, settlers began moving eastward, founding smaller settlements, including Escalante in 1876, and Boulder, the most isolated town in Utah until the mid-1930s when the Escalante Road was constructed. Both counties in the socioeconomic study area have ties to the pioneers who settled the area, and the influence of these pioneers remains strong today.

Historically, settlers used the vast rangeland to raise livestock. Garfield County also developed a large lumber industry, which remains important to the county today. In the 1920s and 1930s Kane County catered to film production and was called “Little Hollywood.” About the same time, the establishment and development of national parks brought tourism to both counties. The service and tourism industries of Kane County, and to a lesser extent Garfield County, increased further with the Glen Canyon Dam project and the creation of Lake Powell. Tourism has become an increasingly important component of the local economy, with greater access and greater national interest in the natural beauty of southern Utah.

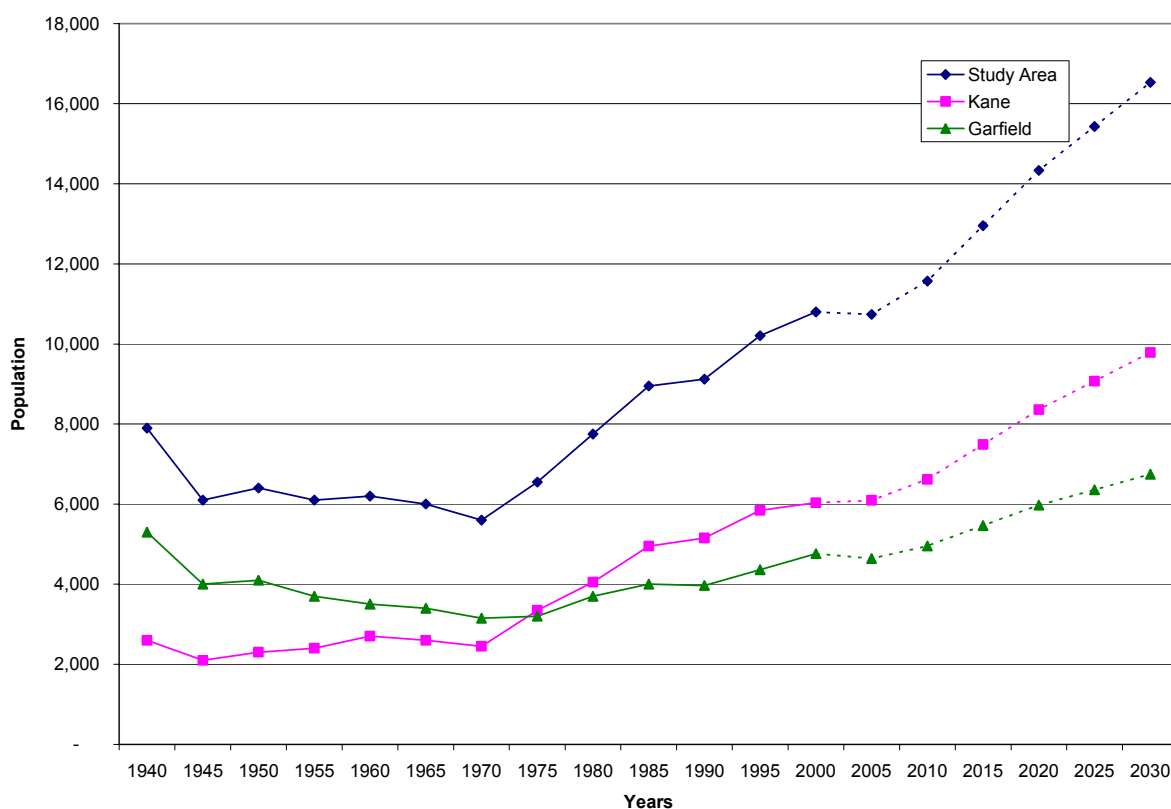
The socioeconomic study area is sparsely populated because of its isolation, aridity, and ruggedness. Garfield County averages less than one person per square mile, making it the least dense county in Utah. The entire study area is only slightly more dense, and is considerably less dense than the state as a whole (27.2 persons per square mile).

Historical population data for each county and the socioeconomic study area from 1940 to 2005 and population projections from 2010 to 2030 are plotted in Figure 3-2. From 1970 to 2003, Kane County’s population increased by 3,487—a 142 percent increase, Garfield County’s population increased by 44 percent, and the study area’s population increased by 87 percent. Kane County’s population increased faster than the state and the national growth rate; Garfield County’s population increased more slowly than the state’s but outpaced that of the nation (EPS 2005). Kane County’s population overtook that of Garfield County, reflecting growth that resulted from Kane County’s proximity to the growth center of St.

George, Utah. However, according to the latest population estimates from the Utah Governor's Office of Planning and Budget, Garfield County experienced a modest population decline (118 persons, or 2 percent) from 2000 to 2005, while Kane County's population growth flattened considerably. The State of Utah expects growth rates in both counties to continue at historic 1970 to 2000 rates, and to continue growing at those rates through the RMP planning period.

Kane County had a positive net migration rate of 12.1 percent in the 1980s and the same rate in the 1990s, which means more people moving into the county than leaving. Conversely, Garfield County experienced negative net migration, which means more people moving out than coming in. However, Garfield County's percentage of people moving out relative to moving in decreased during the 1990 to 1999 period to negative 0.3 percent, compared with negative 5.8 percent from 1980 through 1989.

Figure 3-2. Socioeconomic Study Area Population Trends and Projections



Note: Dashed lines indicate population projections by the State of Utah for 2005 to 2030. Values for 2015 and 2025 are straight-line interpolations of 2010, 2020, and 2030 projections. All other data points are from the source.

Source: Utah Governor's Office of Planning and Budget (2004a), State of Utah Demographic and Economic Analysis, Utah Population Estimates Committee

In the socioeconomic study area there is little land that is privately owned. Most (88 percent) is administered by the Federal Government. The BLM manages the largest portion of federal land in the socioeconomic study area (2.69 million acres), USFS manages 1.16 million acres, and NPS manages 0.89 million acres.

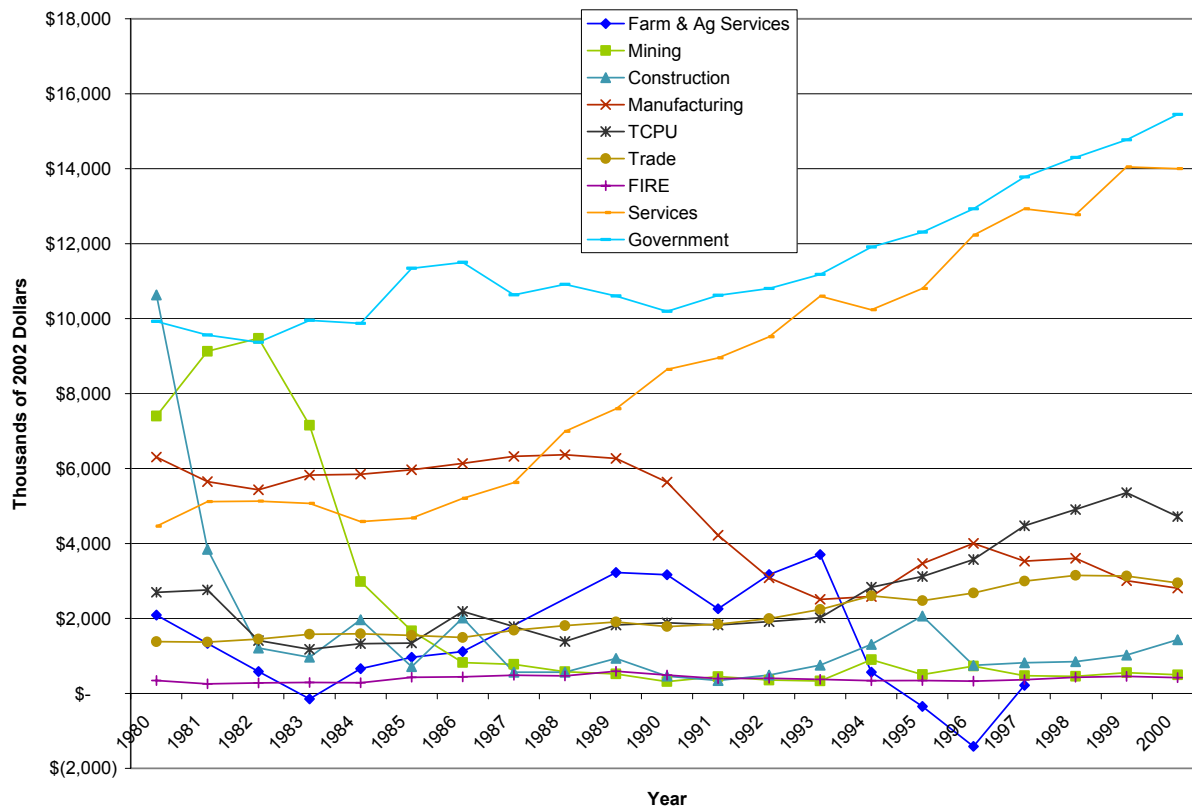
Economic Characteristics

Levels of and changes in the labor force and unemployment provide information on the relative health of the local economy. Kane and Garfield counties, as well as the state as a whole, showed increases in the labor force over the 10-year period from 1994 to 2003, but the socioeconomic study's annual average rate increase in the labor force (0.6 percent) was lower than the state's (1.7 percent). From 1990 to 2003, the unemployment rate for the study area was higher than that for the state and nation, and showed more volatility (fluctuation) throughout the 1990s. The average unemployment rate for the 14-year period was 7.9 percent for the study area, 4.2 percent for Utah, and 5.6 percent for the United States.

Total personal income was more than \$230 million in 2002, an increase of more than \$60 million (inflation adjusted) since 1992. This represents a total real personal income growth of 3.5 percent annually over 10 years. Labor income has consistently accounted for the greatest percentage of personal income for the study area; however, non-labor income has increased substantially in importance over recent decades.¹ The percentage of total personal income derived from labor decreased considerably from 75 percent in 1970 to 59 percent in 2002. The annual percentage increase in labor income over this period was 2.9 percent, but investment income and transfer payments grew at faster annual rates, increasing by 5.1 percent and 5.3 percent, respectively. These trends are similar to state and national trends.

The distribution of income by industry provides a good indication of the relative economic importance of various industries in the socioeconomic study area. Figure 3-3 and Figure 3-4 show trends in labor wages and salaries for nine industry groups from 1980 to 2000. In both counties, the services sector and the government sector provided the greatest amounts of wages and salaries in the study area, and both show substantial upward trends. In Garfield County, both mining and construction earnings declined substantially in the early 1980s, and have not gone back up. In Kane County, the trade industry has provided substantial and increasing amounts of wages and salaries. Manufacturing declined in Garfield County in the early 1990s, but increased substantially in Kane County in the late 1990s. Agricultural wages and salaries have been volatile in both counties, including some periods of negative earnings. Wages and salaries from other sectors have been relatively low, and essentially flat, over the 2-decade period.

¹ *Personal income consists of labor and nonlabor income. Labor income is derived from wages, salaries, and self-employment income. Nonlabor income includes investment income and transfer payments. Investment income is gained from rents, dividends, and interest earnings. Transfer payments are largely derived from social security benefits, Medicare and Medicaid benefits, and other income support and assistance.*

Figure 3-3. Trends in Wages and Salaries by Industry for Garfield County, 1980–2000

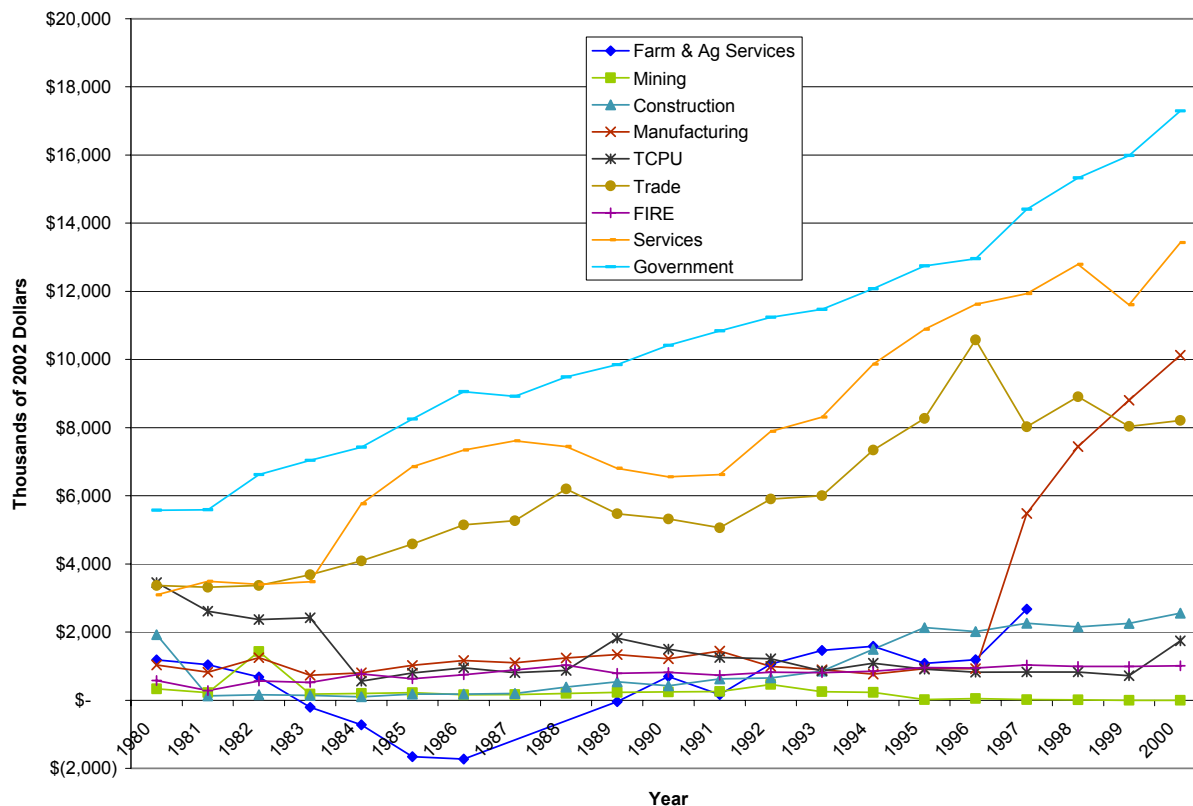
TCPU is Transportation, Communication, and Public Utility employment.

FIRE is Finance, Insurance, and Real Estate employment.

Farm & Ag Services data were not available for 1987, 1988, 1998–2000. Data gaps are due to data disclosure restrictions of the Bureau of Economic Analysis.

Non-agricultural industries source: State of Utah Governor's Office of Planning and Budget 2004b.

Farm & Ag Services source: EPS (2005), using U.S. Department of Commerce Bureau of Economic Analysis data (Regional Economic Information System 2002 CD Table CA05).

Figure 3-4. Trends in Wages and Salaries by Industry for Kane County, 1980–2000

TCPU is Transportation, Communication, and Public Utility employment.

FIRE is Finance, Insurance, and Real Estate employment.

Farm & Ag Services data were not available for 1987, 1988, 1998–2000. Data gaps are due to data disclosure restrictions of the Bureau of Economic Analysis.

Non-agricultural industries source: State of Utah Governor's Office of Planning and Budget.

Farm & Ag Services source: EPS (2005), using U.S. Department of Commerce Bureau of Economic Analysis data (Regional Economic Information System 2002 CD Table CA05).

Demographic Characteristics

The ethnic makeup of the socioeconomic study area is predominantly white (95.5 percent in the 2000 census), as it is for the state (89.2 percent). Garfield and Kane counties are similar in ethnic makeup, and there are only slight differences in ethnic composition between the study area and the state. The study area has a higher percentage of whites and a smaller percentage of Hispanics or Latinos than the state. The percentages of other ethnic groups in the study area are small and similar to those of Utah as a whole.

The median household income in the 2000 census was \$32,400 in Garfield County and \$31,500 in Kane County, compared with \$42,100 for the state and \$38,700 for the nation. However, median household income increased more rapidly during the 1990s in the socioeconomic study area (105 percent) compared with the state (96 percent) and the nation (76 percent).

Both counties had a higher rate of individuals below the poverty level than did the state and the nation in the 1990 census. However, in the 2000 census, poverty rates in Garfield County (8.1 percent) and Kane County (7.9 percent) were less than those of the state (9.4 percent) and the nation (12.4 percent).

The median age for individuals in Garfield County in the 2000 census was 33.8 years, which is an increase from 31.3 years in the 1990 census. Kane County's median age in 2000 was 39.1 years—a substantial increase from 30.8 years in 1990. Both counties have a higher median age than Utah (27.1 in 2000). Kane County's median age is also higher than that of the nation (35.3 in 2000). The high figure and sharp increase in median age for Kane County can be explained by the spillover of retirees migrating to the St. George area.

Resource Uses and Values

The Forestry and Woodland Products section of this chapter provides details about these uses of BLM lands. There are no commercial saw timber operations within the decision area. There is limited commercial and non-commercial harvesting of fuelwood. The KFO sold an average of 560 cords of wood per year in 2001 through 2004. In addition, there is harvesting for Christmas trees and posts.

Calculation of the value of livestock grazing within the decision area is based on the 5-year average of authorized AUMs since management has been tracked (2000 through 2004; see the Livestock Grazing section of this chapter), and assumes that all authorized AUMs were in fact used. Authorized AUMs in this period averaged 7,239 for cattle, and 153 for sheep and goats. The average value of production per AUM in 2003 dollars for the State of Utah is \$41.22 for cattle AUMs and \$22.93 for sheep AUMs, based on the methodology described in the *Socioeconomic Baseline Report*. Applying these values to the authorized AUM figures shows that the average value of production for livestock grazing within the decision area in recent years is \$298,400 for cattle and \$3,500 for sheep and goats, or \$301,900 total. Combined with information on livestock production across the entire socioeconomic study area, these data show that 2.6 percent of the most recent 5-year annual average of cash receipts for livestock and livestock products (\$11,502,000) can be attributed to grazing on BLM lands. However, this small percentage figure may not reflect the full significance of grazing on BLM lands. For example, this grazing could be critical to certain operators at certain times of the year when other forage or feed is unavailable or expensive.

The Recreation section of this chapter provides information on recreational use within the decision area. The BLM's RMIS database of recreational activity data indicate that during 2001 through 2006, the activities with the most participants were (in descending order) OHV use, big game hunting, hiking/walking/ running, backpacking, and viewing. The activities with the highest visitor-days (12 hours of activity) were (in descending order) backpacking, big game hunting, OHV use, camping, and hiking/walking/running. The RMIS data show a peak in overall visitation in federal Fiscal Year 2002, followed by 3 years of somewhat lower, but increasing use. Total visitor numbers increased to a peak in 2006, and visitor-days were near peak in Fiscal Year 2006.

Other recreational visitation numbers for the socioeconomic study area have declined in the past several years, mirroring trends for the state and nation. Figures from the Utah Division of Travel Development (2005) indicate visitation to most state and national parks in the study area peaked during 1999 through 2000, and in most cases has declined since. The State Division of Parks and Recreation (2003) attributes these recent decreases in visitation to slumping global economy and decreased tourist travel following the September 11, 2001, terrorist attacks. The state also notes that despite the decrease in visitation, recreation- and tourism-related sectors have substantial potential for growth. Long-term increases in recreation visits are likely as a result of projected state and regional population growth, interest in the world-class recreational resources of southwestern Utah, and an aging population that will demand increased opportunities for leisure and recreation.

Recreation is an important part of the local economy. When non-local recreationists come to the area, their expenditures within the area represent inflows of money, which generate jobs and income.

Recreation-related expenditures especially support the services sector, which is the second-largest sector of the local economy, for wages and salaries in both Garfield and Kane counties, as shown in the figures above. The Utah Division of Travel Development (2005) estimates that there were 1,916 travel- and tourism-related jobs in the socioeconomic study area in 2003. According to the division, 44 percent of total employment in Garfield County was in tourism-related jobs, and 37 percent in Kane County. The division estimates that travelers spent a total of \$82.9 million in the study area in 2003, resulting in \$1.7 million in tax revenues to local governments. Recreational use of BLM public lands is no doubt the basis for an important component of this economic activity.

Lands and realty actions and policies, detailed in the Lands and Realty section of this chapter, have important socioeconomic effects. Land disposals, ROWs, leases, permits, and easements allow for economic activity and community expansion and may further the economic development of communities within the planning area or serve other important social purposes. Withdrawals and land acquisitions may protect important resources of economic or social significance to the public.

Lands and realty actions also have important implications to public finance. Disposal of BLM lands to private ownership may reduce Payments in Lieu of Taxes (PILT) by the Federal Government to local government, but also may result in payments of property taxes to local government by the new private property owner(s). Acquisition of private land by the BLM would reduce property taxes paid to local governments, but would typically increase PILT payments.

Mineral and energy development on lands and federal mineral estate managed by the KFO currently includes 23 authorized oil and gas leases on 65,500 acres. Drilling activity has declined steadily since the 1960s, with only one well drilled on federal property in the 1990s. There is some renewed interest in oil and gas in the area, but there are presently no APDs. Most of the 30 previous leases for coal development were closed out in the 1980s and 1990s. Currently there are no authorized coal leases, although one request has been filed. There are 11 active mining claims, 1 active notice, and 1 active plan of operations for locatable minerals. For mineral materials (e.g., sand and gravel), 10 free use permits are active, and 75 to 100 over-the-counter permits are issued each year. The Minerals and Energy section of this chapter provides additional information on these uses, and the *Socioeconomic Baseline Report* provides information on economic values.

Lands in the decision area contribute to the livelihoods of area residents through subsistence uses as well as through market-based economic production and income generation. Public lands provide products of value to households at no or low cost (permit fees). These products include fuelwood, Christmas trees, wood posts, livestock raised for household consumption, pine nuts, and mineral materials such as sand and gravel. Additional products with subsistence value may include fish, game, plants, berries, seeds, and more. Products of BLM lands are of special value to low-income households. In addition, use of these products is often part of family traditions and it sustains local culture.

Public Finance

Lands and federal mineral estate managed by the KFO affect local, state, and Federal Government budgets to the extent they produce mineral royalties, taxes, PILT, fees, and other revenues, or result in government expenditures for management, law enforcement, and other activities. This topic is discussed in detail in the *Socioeconomic Baseline Report* and summarized below.

The Federal Government's Minerals Management Service collects royalties and rents from leases of federal lands for production of coal, oil, gas, and other minerals. The Minerals Management Service also collects bonuses on certain leases. The federal mineral estate in the socioeconomic study area produces low mineral revenue compared with that in other parts of Utah. In state Fiscal Year (July 1–June 30)

2004, Garfield County generated \$604,000 in oil and gas royalties, rents, and bonuses and Kane County generated \$194,800. The entire state generated \$134.4 million.

The KFO collects fees and other revenue for a variety of other uses of BLM lands. These revenue sources include ROW rents, recreation fees, grazing fees, various permit fees, and more. Most of the revenues from sales of land and vegetative materials, along with ROW rents, go to the federal treasury, but recreation fees are retained by the KFO. A portion of the revenue generated from mineral material permits is returned to the county of origin. Section 3 grazing permit fees associated with federal AUMs generate revenue for the U.S. Treasury, of which 12.5 percent is returned to the local Grazing Board via the state in which the AUMs are located. This money is then disbursed to local ranchers through the local Grazing Board, using a 40/60 matching-funds formula, for use in range improvements and maintenance projects (See Taylor Grazing Act Section 10).

Fifty percent of federal revenues from oil and gas royalties, rents, and bonuses are returned to the state of origin. In Utah, these revenues are channeled through the Utah Department of Community and Economic Development to various state funds and other state and local agencies. In the State of Utah's fiscal year 2004, Utah received \$399,400 generated by the federal mineral estate in Garfield and Kane counties.

The State of Utah collects several taxes and fees that derive from natural resources on both private and public lands. These include the mining severance tax, oil and gas severance tax, oil and gas conservation fee, and income taxes on mineral production income. Due to the relatively low level of mineral and energy development in the socioeconomic study area, the state earns minimal revenue from its taxes and fees.

Much of the state's federal oil and gas royalty, rent, and bonus revenue is disbursed to local governments. The primary means for the disbursements are through the Utah Department of Transportation (UDOT), the Permanent Community Impact Fund, and the Special Service Districts Fund. Only the UDOT funds are directly proportional to the federal mineral revenue produced by each county. In State of Utah fiscal year 2004, Garfield County received \$148,900 through UDOT; Kane County received \$53. Kane County generated primarily bonus revenue, which unlike royalty and rental revenue is deposited into state discretionary funds rather than the "pass-through" UDOT fund.

Another source of local funds based on natural resources is taxes on natural resource properties. Local governments assess real and personal property, but the State of Utah assesses the value of natural resource property, specifically oil and gas wells, metal mines, coal mines, sand and gravel mines, and non-metal mines. County treasurers then set and collect taxes from these properties. On public lands, the values and taxes are based on the higher of (a) the value of equipment on the site or (b) discounted cash flow from production if the well or mine is producing. These properties may be located on either private or public land. Table 3-37 shows the amounts collected by the socioeconomic study counties in 2003. These figures reflect all lands in the two counties; a breakdown for BLM lands is not available. The total local taxes charged against natural resource properties in the study area were about \$154,400 in 2003, which represents 1.5 percent of the \$9,949,000 in total local property taxes collected in the socioeconomic study area.

Table 3-37. Local Property Taxes Charged Against Natural Resource Properties, 2003

County	Oil and Gas Extraction	Metal Mines	Coal Mines	Sand and Gravel	Non-Metal Mines	Total Natural Resource
Garfield County	\$67,885	\$53,556	\$0	\$8,582	\$0	\$130,023
Kane County	\$0	\$0	\$0	\$19,670	\$4,673	\$24,342

County	Oil and Gas Extraction	Metal Mines	Coal Mines	Sand and Gravel	Non-Metal Mines	Total Natural Resource
Study Area	\$67,885	\$53,556	\$0	\$28,252	\$4,673	\$154,365

Source: Utah State Tax Commission (2004), 2003 Annual Statistical Report, Local and Centrally Assessed Property

A source of local government revenue directly attributable to the public lands in each of the counties is PILT. PILT payments are made by the Federal Government to compensate counties for lost property tax revenue attributed to federal lands. PILT payments to Garfield and Kane counties in recent years are shown in Table 3-38. In Fiscal Year 2004, PILT payments for all federal lands in the two counties totaled nearly \$942,000. These payments cannot be readily attributed to BLM versus other federal lands.

Table 3-38. Payments in Lieu of Taxes, 1999–2004

County	1999	2000	2001	2002	2003	2004
Garfield County	\$209,702	\$224,873	\$357,580	\$375,382	\$416,983	\$428,693
Kane County	\$274,860	\$342,723	\$420,052	\$432,522	\$499,106	\$513,297
Study Area	\$484,562	\$567,596	\$777,632	\$807,904	\$916,089	\$941,990

Source: BLM (2004b), Payments in Lieu of Taxes website, Total Payments and Total Acres by State/County

Federal Government expenditures related to federal lands benefit the local economy because federal salaries to land management staff who reside in the socioeconomic study area and federal contracts to businesses located in or with employees residing in the study area represent inflows of money to the study area. During the federal Fiscal Years 2001 through 2004, total KFO salaries averaged \$803,500 per year. During the same period, the KFO paid an average of \$179,600 per year in contracts to local firms.

Management of BLM-administered land may affect state and local budgets. For example, recreation on public lands requires some support from local government for road maintenance, law enforcement, and search and rescue. It is difficult to separate expenditures related to BLM-administered land from expenditures related to other land. Additional types of state and local expenditures that may be affected by public land use include emergency medical services, wildlife management, fire management, solid waste collection and disposal, and public utilities.

Environmental Justice

EO 12898, Federal Action to Address Environmental Justice in Minority Populations and Low-Income Populations, requires federal agencies to identify and address disproportionately high and adverse human health and environmental effects of federal programs, policies, and activities on minority and low-income populations.

Relevant census data for the two counties within the socioeconomic study were collected to determine whether populations residing in the study area constitute an “environmental justice population” by meeting either of the following criteria:

- At least one-half of the population is of minority or low-income status
- The percentage of population of minority or low-income status is at least 10 percentage points higher than for the entire State of Utah.

As shown by the figures in the Demographic Characteristics section of this chapter, neither county has populations that meet either criterion. Thus, at the county level, no populations within the study area meet the criteria to be subject to environmental justice considerations. It is possible that some highly localized minority or low-income populations exist.

Values and Attitudes

Today, although fewer families earn their livelihood solely from livestock production or natural resources such as timber and minerals than in previous times, the descendants of the area's settlers still have strong connections to the land. Access to public land and resources, whether for earning a living or for recreating, remains important to the local people. These connections to the land are as obvious as the cultural importance of livestock grazing and as subtle and unknown (to non-residents) as the tradition of "Eastering," in which local families at Easter time roll eggs down sand hills, the winner declared by having the last egg to break.

Economic and social connections to public land use were often mentioned in the public scoping process for the RMP, which occurred in early 2005. Comments were often related to OHV use and route designations, livestock grazing, recreation, and general access to public lands. Many of those who made comments were concerned that increased restrictions would lead to a change in their traditional use of the public lands surrounding their communities. Many also expressed a desire to maintain or expand the local economies by allowing the most economically beneficial resource uses to occur. Some of the resource uses mentioned to have economic benefits included mineral development, grazing, tourism, and OHV use.

Some respondents identified public land use as a way of life for local communities. In particular, many of these individuals felt that it was important that grazing on public lands be recognized as a historically important use of land that is worth preserving. There were comments that differed from this point of view in terms of the sustainability of grazing on public lands, but no individuals or groups denied the historical importance of grazing.

Some individuals indicated that management decision processes were not accounting for costs associated with some resource uses. Among the costs mentioned were environmental remediation for mineral development sites, range management for livestock grazing, and management for OHV use. In addition to management costs, many respondents raised concerns about the environmental impacts of many activities on public lands. These concerns were voiced by individuals residing within and outside the socioeconomic study area. Given the statewide and national significance of resources in the decision area, many individuals outside the socioeconomic study area have strong values and attitudes about the management of BLM-administered lands. Other common concerns indicated perceived conflicts between motorized and non-motorized uses, between resource development and primitive recreational experiences, and between other uses of public lands.

Interests in BLM Lands

Based on economic and social connections to BLM lands, several broad types of use are defined for the purposes of social impact analysis in Chapter 4. These categories reflect the many different interests that exist in use of BLM lands, and are characterized by a distinct set of opinions and perceptions about BLM lands and the effects of various land management policies and actions. To some degree these categories can be aligned with different social groups, but at the same time, many specific individuals or organizations may have multiple interests and would probably view themselves as being classified into more than one category. Seven types of interest have been defined for consideration in the impact analysis, as follows:

- *Local traditional use*—People who would see themselves as having this interest in public lands include individuals who place a high value on using BLM lands to gather fuelwood, Christmas trees, wood posts, pine nuts, and other products for personal use or small-scale commercial purposes. Typically these people are local residents. Such gathering often helps supplement and stretch household incomes. In addition, these activities preserve family traditions and sustain local culture. This interest category also encompasses Sunday afternoon drives and other dispersed uses and enjoyment of BLM land by local residents.
- *Motorized recreation*—This category includes individuals and groups with interests in both on- and off-highway motorized uses. The first type includes road-based sightseeing, often referred to as “windshield tourism,” such as tour buses and automobile tourists who drive primary and secondary roads, stopping occasionally to take in special sights or in local towns for gas or food. The second type of motorized recreation includes OHV use, which is often categorized as “destination tourism,” in which the travelers have in mind activities at specific locations, and often stay in the locale for multiple days, generally resulting in larger local expenditures.
- *Non-motorized recreation*—Individuals and groups with this interest engage in hiking, backpacking, horseback riding, mountain-biking, and other activities based around non-motorized off-road travel. Often this interest is characterized by a search for solitude or escape from developed sites, machines, and other aspects of day-to-day life. This interest typically reflects “destination tourism.”
- *Outfitter-based recreation*—The primary distinguishing characteristic of this category of use and interest is the hiring of second parties—outfitters or guides—as a way to improve the recreationist’s experience. Typically, but not always, this is related to hunting. The hiring of outfitters or guides results in additional local expenditures, and is a special case of “destination tourism.”
- *Livestock grazing*—People with interests in this category often believe that livestock grazing on public lands is important not only economically but also culturally and socially. People sharing this interest want to support the livelihoods and traditions associated with grazing and ranching, which they view as central to the vitality and values of local communities.
- *Natural resource development*—This interest encompasses commercial development and use of the resources found on BLM lands. Individuals and groups with this interest support mining, timber harvesting, and other traditional resource uses, and believe that the income and jobs generated by these activities are crucial to the local economy.
- *Preservation*—People aligned with the preservation interest tend to value and prioritize the protection of natural resources and general ecosystem health. This can include both local residents and non-locals who emphasize the special scenic and ecological values of the area.

3.5.2 Tribal Interests

Archaeological evidence indicates the natural resources in the decision area have been used by Native Americans for thousands of years by a wide variety of cultural traditions (see Chapter 3 Section 3.2.9 – Cultural Resources). Many contemporary Native American tribes maintain they are descents of the peoples who once occupied this area, including but not limited to the Southern Paiute, Navajo, Hopi, Ute, and Zuni Tribes. Because of this traditional connection, many of these tribes hold a deep interest in the decision area’s resources, as well as the use of those resources. However, strong place attachments can occur whether or not direct lineage is established (Stoffle et al. 2004).

Bands of the Southern Paiute Tribe most recently inhabited and used the area prior to European settlement. Spangler (2001) summarizes both the archaeological and ethnographic evidence of the Southern Paiute’s use of the GSENM and the surrounding areas, which include the decision area. The Bands of the Southern Paiute Tribe reservations were all created by Executive Order between 1873 and 1917. Supreme Court cases have affirmed that, “all Executive Order tribes shall have and be treated as

Treaty tribes.” These Executive Orders established the Kaibab Paiute, Shivwits, Moapa, and Las Vegas reservations. The Kaibab-Paiute Reservation is located entirely within Arizona and is surrounded by the BLM’s Arizona Strip FO on the west, south and east. The State of Utah forms the reservation’s northern boundary, with the majority of the land along the boundary within decision area. The Kaibab-Paiute Tribe has requested that some lands in the decision area, along the state boundary, be made available for disposal to the Tribe.

General areas, specific species, and/or specific sites could be important to contemporary Native American tribes for their traditional uses, or their sacred or religious/spiritual association. Archaeological remains of prior Native American cultures, especially burials, rock art, and habitations, are often religiously/spiritually significant to current tribes. In addition, the physical resources of the area can be important for both traditional uses (e.g., continuing traditional gathering of ceremonial or subsistence vegetation, use of areas for ceremonial purposes) and for association with use by prior Native American cultures (e.g., springs and water sources, areas important due to a concentration of important resources). These areas/sites are generally not known or discussed outside of the affected community but may be present in the decision area.

Historical Native American consultation efforts, as well as the consultation efforts associated with this planning effort, have not identified specific areas or resources of Native American religious concern in the decision area. This includes traditional cultural properties, treaty-based subsistence use areas, traditional use areas, and rights of access. A recent ethnography was conducted by the GSENM for the Paiute Tribe (Stoffle et al. 2001). Although this ethnography did not include lands in the planning area, one of its key findings is that water plays an important part in the Paiute’s life and beliefs. This is supported by Spangler’s (2001) research for the GSENM Class I cultural overview. Springs and rivers provided the water and other resources that the Paiute depended on for survival. Sources of water, specifically springs, are a potential area of Native American religious concern. In addition, contemporary Native American tribes are sensitive to disturbance and loss of archaeological sites, as many tribes maintain these sites are evidence their progenitors and could therefore be religiously/spiritually significant.

The Kanab Field Office coordinates and officially consults regularly with these various Native American tribes/groups to identify and consider their concerns in BLM land use planning and decisionmaking. Further consultation (as part of this planning effort and during implementation of the RMP) will be required to identify and protect specific sites or areas.

3.5.3 Hazardous Materials and Public Safety

There are no known occurrences of hazardous materials or approved hazardous waste disposal facilities within the decision area. Hazardous materials are defined as any material that, because of its quantity, concentration, or physical or chemical characteristics, may pose a real hazard to human health or the environment. Hazardous materials include flammable or combustible material, toxic material, corrosive material, oxidizers, aerosols, and compressed gases.

Management of hazardous materials, substances, and waste (including storage, transportation, and spills) will be conducted in compliance with 29 CFR 1910, 49 CFR 100-185, 40 CFR 100-400, Comprehensive Environmental Response Compensation and Liability Act, Resource Conservation and Recovery Act, Superfund Amendment Reauthorization Act, Toxic Substances Control Act, Clean Water Act, and other federal and state regulations and policies regarding hazardous materials management.

Databases of previous mining operations exist for the decision area, but no formal inventories for abandoned mine lands have occurred. Because of previous mining operations throughout the decision area, there is a potential for physical safety hazards and/or environmental issues.

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